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ABRIDGMENTS

OF THE

Specifications

RELATING TO

FIRE-ARMS AND OTHER WEAPONS, AMMUNITION, AND ACCOUTREMENTS.

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B. W.

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FIRE-ARMS AND OTHER WEAPONS,

AMMUNITION, AND ACCOUTREMENTS.

THE history of the improvements made in fire-arms and ammunition, since they were introduced into the military systems of Europe down to the present time, shows that their progress has been very slow, and that their real advancement up to a recent period was remarkably small.

Mr. Robins, in his Preface to the "New Principles of Gunnery," first printed in 1742, said: "The formation of artillery hath been "very little improved in the last 200 years" (that is, since 1542).*

In fact, improvement seems to have been limited to the discovery of neater mechanical contrivances for effecting an ignition of the charge, or for mounting the piece in its stock or on its carriage; the main principles of construction remained for a long period unimproved.

It is worthy of notice that a very large proportion of the so-called inventions (relating to fire-arms) of the present day are, in fact, old contrivances, sometimes modified and adapted to modern requirements, but very often identical with what has been tried and abandoned as useless long ago. From the year 1617 down to the end of the year 1852, not more than about 300 patents were granted for inventions relating to fire-arms. When the war with Russia broke out, the Patent Office was inundated with applications for Letters Patent for similar inventions; and about 600 have since then been actually granted. Of these it may be safely said that five-sixths of the applications related to old contrivances which have been patented over and over again. Possibly the applicants were in many cases actual inventors, or rather re-inventors, and were so far deserving of credit; but a large proportion would never have petitioned for Letters Patent, and paid fees to no purpose, if they had made themselves acquainted with the Records of the Great Seal Patent Office, which are now printed and accessible to all who wish to consult them.

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* P. 36, Author's Preface, edition of C. Hutton, London, 1805.

When it is considered how important were the results in warfare produced by the adoption of fire-arms, and to what an extent their use has undoubtedly affected the present condition of nations,* it is difficult to account for their slow progress and for the ignorance that so long prevailed with regard to the principles of gunnery and the proper mode of applying them in practice.†

Down to the time of Mr. Robbins, no scientific inquiries into the subject had been regularly pursued, and it cannot be said that his researches and those of Dr. Hutton were satisfactorily followed up.

The Emperor Napoleon III., in the Preface to his admirable treatise on the "Past and Future of Artillery,"‡ offers an explanation on the subject. He says that the progress of artillery had to contend against two "ennemis redoutables, les innovations "imprudentes et la routine." Among the instances given of "innovations imprudentes," he mentions a kind of "organ gun" used from about the fourteenth century, constructed in three tiers, and throwing 140 balls at once, a huge plough to plough up trenches in siege operations, great guns throwing shot of 700 kilogrammes (about 1,400 lbs.) in weight; and steam-guns

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* Mr. Hallam thus speaks of the invention of gunpowder: "Meanwhile a "discovery accidentally made, perhaps in some remote age and distant region, "and whose importance was but slowly perceived by Europe, had prepared the "way not only for a change in her military system, but for political effects "still more extensive," Hist. of the Mid. Ages, vi. p. 479. London, 1855.

† Imperfection in the tools employed, and want of accuracy in manufacture were, doubtless, great obstacles in the way of progress. In 1766, a truly bored cannon or cylinder was a thing impossible to be obtained. [See Farey on the steam-engine, Ed. 1827, pp. 291, 326.] The boring machine of Mr. John Wilkinson of Bersham, effected great improvements. See Muirhead, Life of Watt, p. 246.

‡ Œuvres de Napoléon III. Paris, 1856. Tome IVme. Du Passé et de l'Avenir de l'Artillerie, avant propos, pp. 15, 17. The Preface is dated, Fortress of Ham, May 24, 1846.

(canons à vapeur).[*] Some of these contrivances have more than once made their reappearance in our own time as new discoveries. “Inventions that are before their age,” he further remarks, “remain useless until the stock of general knowledge comes “up to their level.” Again: “Whatever is complicated fails in “producing good results in warfare; the promoters of systems “forget always that the object of progress ought to be to obtain “the greatest possible effect with the least possible effort and “expense.” He, however, lays the greatest blame on the opposition of *routine*, “which, being enamoured with old ways, “has preserved for ages practices that are most stupid.”[†] And “not only does *routine* scrupulously preserve like some sacred “deposit the errors of antiquity, but it actually opposes might “and main the most legitimate and the most evident improve-“ments.”[‡]

The Emperor wrote especially with reference to the military systems of France, but it is clear that his observations will apply equally well to other countries.

It may perhaps be said that advancement in the construction of fire-arms has been retarded or broken from time to time by intervals of peace; but, on the other hand, their manufacture has been as incessant as that of the younger creations of man's ingenuity, the steam-engine, or cotton machinery; and, moreover, their use by the British soldier, in some quarter or other of the globe, may be considered as being almost uninterrupted.

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[*] Denys Papin in 1688 speaks of steam being applied “to discharge iron bullets to a great distance.” Acta Erud: Lipsiæ, 1690. See Muirhead, Life of Watt, p. 145. Papin also constructed an air-gun in 1679. Ext. Birch, History of the Royal Society. The Marquis of Worcester gives hints of the application of steam to guns, in his Century of Inventions. David Rivault describes a steam bomb-shell in his book, Les Elemens de l'Artillerie, &c. published in 1635, at Paris. Much was expected in our own times from the use of steam-guns, but there are great objections to their practical adoption. An anecdote is told of the late Duke of Wellington, that after examining Perkin's steam-gun with great attention, and asking many pertinent questions about its weight, the means of moving it, getting up steam, &c. he dryly observed, “If “steam-guns had been invented first and gunpowder afterwards, what a capital “improvement gunpowder would have been.”

[†] Page 16: “D'un autre côté la routine amoureuse des vieilles pratiques a conservé pendant des siècles les usages les plus stupides.”

[‡] “Non seulement la routine conserve scrupuleusement comme un dépôt “sacré les vieilles erreurs, mais elle s'oppose encore de toutes ses forces aux “améliorations les plus légitimes et les plus évidentes.” Avant propos, p. 17.

Great attention, however, has been lately paid to the subject, as is proved by the great number of applications for Patents already referred to; and results are being obtained which are so satisfactory as to justify the expectation that this country may claim the credit of bringing to the greatest possible perfection the invention which, there is good reason to believe, she was the first to employ in European warfare.

It is impossible to doubt that several eastern nations were well acquainted with the composition of gunpowder for ages before it was known in Europe; and when it became known to a few sages here, it was probably preserved for some time as one of the mysterious secrets and powerful juggling agents of the alchymists before it was published abroad.

Mr. Robbins, in his preface already quoted, says: "As the time
" of the discovery of saltpetre is confessedly uncertain, it is not
" to be wondered at that the invention of gunpowder should be
" obscure and unknown, for these two discoveries are so connected
" that it is difficult to conceive how the first could be long known
" before the latter was found out."* Again: "On this supposition,
" then, if we knew the time when saltpetre first came into use,
" we might give some guess when mixtures resembling our present
" gunpowder were first invented."

This is no doubt correct, for if nitre were by accident combined with charcoal, one of the commonest of substances, it might form gunpowder without any sulphur being present, as that ingredient is not indispensable. It would therefore be a waste of time to endeavour to ascertain at what time or place gunpowder was first used. The composition was the result of gradual changes, the combustible productions of nature, as naphtha, sulphur, saltpetre, were probably used by the nations to whom they were familiar, either singly, or compounded with other common substances. Hence also came the Greek fire and other inflammable compounds, which, as their use became more general, were improved in manufacture and employed with greater effect.

Sir George Staunton, in his account of the embassy to the Emperor of China,† states that "nitre is the natural and daily

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* Author's Preface to the "First Principles of Gunnery," p. 27, Robbins ed. 18.

† Embassy, &c., vol. ii. p. 292. second ed.: London, 1798. Quoted by Colonel Chesney in his work on fire-arms, page 20. Ed. London. 1852.

“ produce of China and India, and there accordingly the know- “ ledge of gunpowder seems to be coëval with that of the most “ distant historic events. Among the Chinese it has been “ applied at all times to useful purposes, such as blasting rocks “ and removing great obstructions, and to those of amusement, “ in making a vast variety of fire-works. It was also used as a “ defence, by undermining the probable passage of an enemy, “ and blowing him up.” He adds: “But its force had not been “ directed through strong metallic tubes, as it was by Europeans “ soon after they had discovered that composition.”

The opinion expressed by Sir George Staunton in the last sentence does not agree with the accounts of other writers, who assert that the Chinese used gunpowder with fire-arms hundreds of years before the Christian era.

Monsieur Paravey, in a report made by him to the Académie des Sciences, in 1850, says that it is mentioned in the books of the Chinese that “in 618 B.C., during the Taing-Off dynasty, they used a cannon bearing the inscription, “I hurl death to the “ traitor and extermination to the rebel.”

A curious circumstance connected with the construction of the great wall of China is narrated by Captain Parish, who accompanied Lord Macartney to China. It seems to show that 2,000 years ago the Chinese used jingals, or wall guns, or some fire-arms of that kind. Speaking of the embrasures in the great wall, which was built about 221 B.C., he observes: “The soles of the embrasures “ were pierced with small holes, similar to those used in Europe “ for the reception of the swivels of wall-pieces. The holes appear “ to be part of the original construction of the wall, and it seems “ difficult to assign to them any other purpose than that of resis- “ tance to the recoil of fire-arms.” *

This account is further confirmed by Don Diego Ufano, a Spanish writer upon artillery, whose work was translated by J. T. de Bry in 1614. A.D. Ufano quotes Andrieux d'Aquirre,† Provincial of

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* Embassy to China by Sir G. Staunton, vol. ii. p. 198. See Col. Chesney passim.

† The reverend father says, “qu'en l'an de nostre Seigneur 85, ceste invention “ eut son commencement en ses quartiers, et qu'en auculnes provinces mari- “ times du dit royaume on trouvait encore pour le jourd'huy quelques pièces “ d'artillerie fort anciennes de telle façon et proportion, tant de fer que de “ cuivre, avec mémoire de l'année de leur fonte, et engraveure du nom, des

the Order of St. Augustin in the Philippine islands, who, in his account of the kingdom of China, mentions the name of the king who invented fire-arms, and says that he was one king Vitey, a great necromancer and enchanter, and that he derived his information from his familiar spirit.

Ufano further states* that this account is supported by the testimony of the earliest Portuguese navigators, and that of Father Herrera and his companions, and that it agrees with the contents of a letter written by one Captain Artreda to the King of Spain, informing his majesty of “all the particularities of that great kingdom” (China), and that artillery had been long used there, and that he saw many very old pieces of ordnance in the Chinese arsenals. The memoirs of the missionaries to Pekin also contain many similar accounts.†

Nitre being a natural product and appearing on the earth's surface in many parts of India, there is probably much truth in the accounts given of the very early use of gunpowder there. Philostratus, in his Life of Apollonius Tyaneus, says that the Oxydracæ, who dwelt between the Hyphasis and the Ganges, repulsed their enemies “with storms of lightning and thunderbolts hurled on “ them from above.”

In the Gentoo laws, ‡ which are said to be coëval with Moses,§ a passage occurs which Halhed translates thus: “The magistrate “ shall not make war with any deceitful machine, or with poisoned “ weapons, or with cannon and guns, or any kind of fire-arms.” ||

In the Sanscrit, which has so long been a dead language, words are found answering to gunpowder (“aigmaster—weapon of fire”),

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“ armes blason du roi Vitey, qui en fut l'inventeur, et qu'on sçait par monuments “ des histoires anciennes et véritables, que le dit roi, grand nigromentien et “ enchanteur, aprez avoir conjuré ses enchantements le malin esprit qui lui en “ montrast la façon et l'usage, fut le premier qui en usa contre les Tartares au “ royaume de Pegu, et en la conquête des Indes Orientales.”

* Artillerie, etc., en Espagnol, par Diego Ufano, capitaine d'artillerie, etc., traduit en Francais par J. T. de Bry, c. i. p. i. Francfort, 1614.

† Mémoires des Missionaires de Pekin, tome viii. p. 331, et passim. Many writers, however, assert that the Chinese only used gunpowder for petards, or fuses, or fireworks. See MM. Reinaud et Favé. “Du feu gregeois et des feux “ de guerre.” Paris, 1845. M. Louis Figuier. “Histoire des Principales Décou“ vertes,” &c. Paris, 1855, vol. iii. p. 300.

‡ Lib. ii. c. xiv. See Grey's “Gunner,” printed A.D. 1731. See also Dutens, Origine des Découvertes attribués aux Modernes, p. 197 et passim.

§ Grose, “Military Antiquities,” vol. i. p. 392, London, 1800.

|| Halhed, Preface to Translation of Gentoo Laws.

and cannon ("shatagnee—killer of a hundred men at once)." Mr. Elliott, in his Index to the Historians of Muhammedan India, says that allusions to cannon are made by Chased, a Hindú poet, who wrote about A. D. 1200; he speaks of their loud report, and of the noise of the balls being heard at a distance of 19 coss or 1,465 yards.[*] Muhammed Sháh Bahmiani, A. D. 1368, captured in war 300 gun carriages among other spoil. The Portuguese, on their arrival in the East, in 1498, found artillery in common use, and apparently of old date.

It seems impossible to resist the weight of evidence which shows that both gunpowder and fire-arms were employed in the East long before they were known in Europe.

The earliest European writer who describes the use and composition of gunpowder certainly appears to have been Roger Bacon, Fellow of Merton College, Oxford, who was born about A. D. 1214, and died in 1292. He alludes to the substance and its characteristic qualities in several places, and in one of his treatises he seems to have mentioned the three ingredients of which gunpowder is composed—saltpetre, charcoal, and sulphur, though after the manner of the alchymists, he avoids making his meaning plain, and hides one of the ingredients, charcoal, under an anagram.[†]

Bacon does not profess to be the inventor of gunpowder; he speaks of it rather as something known before, and describes the effects produced by it. It has been said that he may have acquired his knowledge from Arabic writers, or from a book written by Marcus Græcus ("Liber Ignium"), wherein not only the ingredients, but the proper proportions are given, according to Mr. Dutens.[‡] Some of the descriptions contained in Arabic MSS. have been cited as referring to gunpowder, which more probably allude to the use of the terrible Greek fire. This is said to have been a composition of naphtha mixed with sulphur, and resinous, and fatty matters. It also was first used in the East, and became known to the soldiers of Western Europe during the Crusades. In the old metrical romance published by Wharton on the subject of the deeds of Richard Cœur de Lion; the king is said to have used the Greek fire on board his own galley—

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[*] Bibliographical Index to the Historians of Muhammedan India, by H. M. Elliott, pp. 350, 351; Colonel Chesney, p. 31.

[†] In his Treatise "De Secretis Operibus Artis et Naturæ," &c., published at Hamburgh, A.D. 1618, there occurs at p. 69 a mystical passage, whose meaning ingenious commentators have supplied, and made it read thus:—"Sed tamen
11 7 3 5 6 2 9 13 1 10 8 12 4 14 15
"salis petræ, *LURO NAPE CUM UBRE*, et sulphuris, et sic facies tonitrum "et coruscationem si scias artificium." By combining the letters printed in *italic* as figured, the words "carbonum pulvere" are obtained to complete the sentence.

[‡] Dutens, "Origine des Découvertes attribuées aux Modernes." Edition, 1796, p. 197.

> " King Richard out of hys galeye
> Cast wylde fyr into the skeye,
> And fyr gregys into the see,
> And al on fyr were the! "
>
> [Price's ed. Lon. 1840, v. i. p. 161.

It must, however, be remembered that great mistakes may be made, by quoting the vague and indistinct accounts of early writers as anticipating subsequent inventions, merely because their descriptions may be made to bear such a construction as will correspond with what is afterwards carried into practice. There are dreamers in all ages, and some dreams may turn out to be true. One of the Arabic writers above alluded to, and cited by MM. Reinaud and Favé (see Figuier, p. 310), speaks of an incendiary composition which will consume stone castles and melt down iron doors if thrown upon them. It would be difficult to invent any destructive agent that in effect would surpass that described by the Arab. But yet it would be hard to say that a discovery which has yet to be made has, in fact, been anticipated by him.

The Arabic writer, who most plainly refers to gunpowder, is the one mentioned by Mr. Hallam,* who states that his work was found in the library at the Escurial, and may be ascribed to about the year 1249 A.D. The passage does not pointedly describe the use of gunpowder, and it may be a question if it was written before Bacon's Treatise; in any case the instance of an Arabic writer must be considered rather to support the claims of the East, whose priority is acknowledged.

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* Hallam, "History of the Middle Ages," v. i. p. 479. Casiri, Bibl. Arab. Hispan. t. ii. p. 7. Another MS. in the library at St. Petersburgh, also of the fourteenth century, seems to describe gunpowder and fire-arms. "Découvertes," &c. Figuier, v. iii. p. 326.

It is not known when Marcus Græcus or Gracchus wrote the book "Liber Ignium ad comburendos Hostes," on which so much stress has been laid by Mr. Dutens and others as being prior to Bacon, and the source from which he obtained his information.

Beckman, in his "History of Inventions,"* says: "Of this "Marcus Græcus nothing at present is known. According to some "he lived in the ninth, but others with *more probability place* "*him in the thirteenth* century." The "Biographie Universelle" (v. 26, p. 624, Paris, 1820), confirms the opinion of Beckman, and also places Marcus Græcus in the latter half of the thirteenth century. "Nous ne craignons donc pas de trop nous hasarder en "plaçant l'époque à laquelle Marcus-le-Grecq écrivait vers la "*dernière moitié* du xiii^{e} siècle."

Berthold Schwartz, the monk of Cologne, has been by some thought to have discovered gunpowder; he more probably discovered a mode of employing it for fire-arms. Moreover, he is posterior to Bacon, as the date assigned to his discovery is about 1320. On the whole, it seems clear that Roger Bacon is entitled to the merit of being the first European writer who made known the invention (if he did not himself discover it), a merit which the law of England places on a par with that of the original inventor.†

Putting out of consideration the Arabs and Moors, as belonging to the category of Eastern nations, the English may claim to have been the first to use fire-arms in European warfare.

The most authentic accounts show that Edward III. employed cannon in the field as early as A.D. 1327, in his campaign against the Scots. Sir D. Dalrymple Hailes, in his "Annals of Scotland,"‡ gives it as an undoubted fact. Archdeacon Barbour, who was contemporary with Edward III., and during his reign wrote a life of Robert Bruce in verse, expressly states that cannon were used in an engagement between the English under Edward III.,* and the Scotch under Douglas, which took place at Weardale, in August, A.D. 1327, according to Tytler; [see "History of Scot-"land," vol. i. p. 357.]

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* Hist. of Inventions, &c. John Beckman. Translated by W. Johnston. London, 1846. (Bohn.)

† Edgbury *v.* Stevens, Lewis *v.* Marling: Webster, Pat. Ca., vol. i. pp. 35, 492.

‡ Annals of Scotland (from A.D. 1057 to A.D. 1371), &c., by Sir D. D. Hailes, vol. ii, p. 328, 3rd ed. Edinburgh, 1809.

That Barbour is a good authority cannot be doubted; he lived in the times of which he wrote; he was a high church dignitary, and a learned man. Mr. Ellis in his specimens of the early English poets says :† "Barbour is to be considered in the double "character of historian and poet. In the first his authority is "quoted by writers who immediately succeeded him as the most "authentic that can be adduced."

Mr. Ellis adds that the authenticity of the narrative is established by internal evidence, in which the events are described with attention to chronology, and in strict conformity with the opinions and manners of the time. Barbour died at an advanced age, in 1396.

It is true that Froissart, in his account of the expedition of Edward III. in 1327, does not state that he was provided with artillery; but the silence of that chronicler does not disprove a positive statement made on credible authority. Froissart nowhere speaks of artillery as a new thing, or says when it was first used. In the very first allusion he makes to it, he appears to take for granted that its use was a thing well known. It occurs in his account of the siege of Quesnoy by the French, in their invasion of Hainault, in A.D. 1340. He says the invaders "made a feint "as if they intended to attack it [Quesnoy]; but it was so well "provided with men-at-arms and heavy artillery, they would only

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* The Bruce, or Robert I., King of Scotland, Book XIX. Edited by Pinkerton, London, 1790. The lines which allude to artillery are as follows:—

"Twa noveltyes that day thai saw,
That forouth in Scotland had been nane:
Tymmris for helmyss war the ane,

* * * * *

The other crakys were of war,
That thai before heard never air."

The meaning of *crakys* or *crachdys* is plain. The word is connected with the Gaelic *crachd*, rendered in Armstrong's Gaelic dictionary by "acrack," a "smart explosion:" *strepitus*. The Cornish word "crakye" is given as synonymous. A word somewhat similar in sound, *cradh*, is rendered "pain, torment." Perhaps Archdeacon Barbour, who was a scholar, and had been at Oxford, saw a connexion between tormenta and the new engines of war, and used the Gaelic word as being expressive, classically appropriate, and suitable to his verse.

† Ellis, Specimens, vol. i. p. 236. Ed. Lond. 1811.

“ have lost their pains. . . . . Those of Quesnoy let them hear “ their cannons and bombards, which flung large iron bolts in “ such a manner as made the French afraid for their horses.”[*]

The notice here is quite incidental; no particular stress is laid on the fact that artillery was then employed, and though it is the first time Froissart has occasion to speak of it, it may be inferred that he knew, and supposed that others knew, of its having been employed before somewhere—probably in England. This is the more likely, because a large body of Hainaulters, under Sir John of Hainault, formed part of Edward the Third's army, in his Scotch campaign of 1327;[†] and what is more, among the leading knights of Hainault was Sir Thierry de Walcourt, or Vaucourt, who was actually the Quartermaster General of Quesnoy when its artillery repulsed the French. Intimate relations existed between England and Hainault at that time, in consequence of Edward's marriage with Philippa, daughter of the Count of Hainault; and soon after the Scotch campaign of 1327, Edward led an army into Flanders, and with the Hainaulters for allies fought against the French. If, then, the English king used artillery in 1327, it is most likely that his allies would employ them in 1340, or earlier. Turner, in his History of England in the Middle Ages, cites Parliament Rolls and Patents of Edward the Third to show that stones for the King's engines were brought from Sandwich to the Tower in 1334, and that 30 tons of powder (pomadre) were sent to the fortifications of Jersey in 1330 (1339).[‡]

Froissart speaks of the use of artillery by the Scots in 1340, when they besieged Stirling, and he again does so quite incidentally. Stirling was then held by a garrison of Edward III., and the Scots (having probably learned the use of cannon from the English in 1327) “by engines and cannon so pressed the “ garrison that they were forced to surrender it.”[§] Cannon were first used in Ireland, to batter down the castle of Bille Ratha, in 1488. Six hand guns were sent to the Earl of Kildare from Germany.[*]

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[*] Froissart, vol. i. p. 129, translated by Thomas Johnes. Ed. A.D. 1803.

[†] Sir D. D. Hailes, in his Annals of Scotland, vol. ii. p. 345, says that Froissart probably obtained his information of Edward's expedition from one of Sir John de Hainault's knights.

[‡] Hist. of England by Sharon Turner, vol. vi. note p. 491. London 1839. The dates in the note do not seem to be correct. *Pomadre*, Mr. Turner considers, with Mr. Bree, to mean powder. Mr. Grose renders it cyder; but pomade, not pomadre, is the old word for cyder; perhaps poudre is the true reading.

[§] Froissart, Chron., Johne's translation, v. i. p. 190.

Father Daniel[†] says the French first used cannon in 1338, and cites the accounts of 1338, of Bartholomew de Drach (preserved in the Chamber of Accounts, Paris), from which it appears that in that year powder was supplied to Henry de Faumechon, for a castle in Auvergne, Puy Guillaume. The Emperor Napoleon, on the authority of M. Lacahane, mentions that "from about 1339 a noble " knight, named Cardaillac made the cannon necessary for the " defence of Cambrai."[‡]

In 1342, Alphonso XI. employed cannon at the siege of Algeciras.[§] The Moors used them at a still earlier date in all probability.

The instances adduced of the early use of cannon by the Flemings and the French, relate to sieges of fortified towns. No account exists of cannon having been employed on the battle field by any continental army before the battle of Cressy, in 1346, when it was, as is now generally ackowledged, used by Edward III. Artillery men formed at that period a distinct and recognised portion of his army, regularly officered, as appears from the roll of his troops before Calais, Sep. 3, 1346.[‖]

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[*] The Earls of Kildare, by the Marquis of Kildare; Ware's Annals.

[†] Grose, Mil. Antiq., vol. i. p. 399.

[‡] Du Passé et de l'Avenir de l'Artillerie, avant propos, p. 7.

[§] Hallam, Mid. Ages, v. i. p. 479, note.

[‖] The army of Edward III. consisted of—
" The Prince of Wales, receiving as pay per diem 1*l.*;
" The Bishop of Durham, 6*s.* 8*d.*
" 13 earls, each 6*s.* 8*d.*
" 44 barons and bannerets, 4*s.*
" 1,046 knights, 2*s.*
" 4,022 esquires, constables, centenars, and leaders, 1*s.*
" 5,104 vintenars and archers on horseback, 6*d.*
" 335 pauncenars, 6*d.*
" 500 hobilars, 6*d.*
" 15,480 archers on foot, 3*d.*
" 314 masons, carpenters, smiths, engineers, tent-makers, miners, armourers, " *gunners, armed, and those that had the care of the artillery*, at 12*d.*, " 10*d.*, 6*d.*, and 3*d.* per day.
" 4,474 Welsh foot, of whom, 200 vintenars, at 4*d.* per day; the remainder " at 2*d.* per day.
" Total, 31,294 men, besides the lords, and 16,000 mariners in 700 ships and " boats."—Brady, Hist. England, Appendix, p. 87. London, 1700.

The baggage of the army was carried in 6,000 carts, the best horsed that England had ever furnished.—Froissart, v. i., p. 417.

Anderson (Origin of Commerce, v. i., p. 306) says that the total expense of the army for 1 year 131 days was only 127,101*l.* 2*s.* 9½*d.* See treasurer's accounts cited by Brady. Appendix, p. 87.

Villani, Mezerai, and other early historians, state it as a fact undoubted in their times. Froissart is silent on the subject in his "Chronicles," but as has been before stated, no argument ought to be founded on his silence in the face of good authority. Moreover, the Emperor Napoleon III., says* that Froissart does mention the circumstance in a MS. discovered at Amiens by M. F. C. Louandre: "Et li Angles descliquerent aucuns canons "qu'ils avoient en la bataille pour esbahir les Genevois."

He further adds that—

"A contemporary English MS. proves the existence of artil- "lerymen in the army of Edward III.† It is, therefore, natural "that this great warrior had cannon at Crescy. Besides, when "the Prince of Wales marched to Najara, in 1364 . . . . . "he took with him bombards" (the name by which cannon were first designated).

If Edward III. had succeeded then, as appears to have been the case, in organizing field artillery, a work of considerable time, as early as 1346, there is no reason why we should disbelieve credible accounts of his having first used guns in 1327, and having placed artillery in the fortifications of Jersey a few years later.

As it is not proposed to give here any detailed account of the gradual introduction and changes made in fire-arms at various times, it is sufficient to state that about the commencement of the fifteenth century they came into general use. The Emperor Napoleon III. says ‡ that the first artillery "consisted merely of small "iron tubes, which discharged leaden bullets of a small diameter, "called carreaux (squares), because they were armed with an iron "point, shaped like a pyramid, with a square base. The tubes were "mounted on a cart or carriage, provided with screens to protect "the gunners, and with pikes in front to keep off attack. The "cart or carriage was drawn by men or horses, and called 'ribau- "'dequin.' At the end of the fourteenth and beginning of the "fifteenth century, the use of fire-arms came into full play, and was

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* Du Passé et de l'Avenir de l'Artillerie, t. iv. p. 58. Edit. 1856.

† See *ante*, note on the army of Edward III. before Calais, cited from ancient Rolls, by Brady. Appendix, p. 87.

‡ "Past and Present of Artillery," pp. 55, 56, 60, 61, 62. Ed. Paris, 1856. Tome v., p. 60.

" extended everywhere; they had been made in all the forms that
" workmen chose to try. The scale of calibres had been exhausted
" from tubes carrying lead balls, 32 to the pound, up to bombards
" and mortars throwing stone balls of a thousand pounds weight.
" There was the same diversity in the nature of the projectiles, and
" cannon discharged bolts, burning arrows, and balls of stone,
" iron, bronze, and lead, fire-balls, and stones causing fire (pierres
" incendiaires), grenades, shells, case-shot filled with leaden
" balls or sacks filled with stones, and in the middle of all this
" we distinguish, first, portable or hand fire-arms; second, fire-
" arms of small or medium-sized calibres, generally employed as
" field artillery; third, ordnance of large calibre used for the
" attack and defence of fortified places. . . . . . Portative
" fire-arms, or small arms, were employed in towns sooner than
" in the open field. Thus, from 1364, the town of Pérouse had
" ordered to be made 500 small cannon a palm long, fired from
" the hand. In 1369 the English, led by John Chandos, set up,
" says Froissart, some cannon which they carried. In 1381 the
" town of Augsburg had 30 men armed with hand cannon. . . .
" The artillery employed in the field did not differ from fire-arms
" that were portable; it was always the same kind of instrument,
" whether they were carried on horses or in carts, and then fixed
" by hand, or whether they were placed in position on rests or on
" wheels."

When cannon of larger calibre began to be employed, they were, as is well known, sometimes cast and sometimes made of bars of iron or thin cylinders of metal, hooped round with hoops of iron.

Some of the earliest cannon were of immense size. Christine de Pisan,* when describing the battle of Tongres in 1408, as a recent event, speaks of four cannon used there called "Garitte," "Rose," "Seneca," and "Marie." Garitte threw a ball weighing from 400 to 500 lbs., and Rose was a 300-pr.

According to Amelgard, at the siege of Caen, in 1450, there were 24 great bombards, having a diameter at the muzzle so large that a man could sit upright in them. The great gun of Mahomet II., used at the seige of Constantinople, threw, according to Gibbon, a 600 lb. ball.*

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* Livre des Faits d'Armes et de Chevalerie, quoted by Napoleon III.

The proportion of artillery to other troops soon became large. "Le Traité de la Milice," written in 1477 by the Duke d'Ascoli, a Neapolitan, describes the composition of an army of about 20,000 men in his time. It would be composed, he says, of 12,000 horse, 6,000 infantry, 500 pioneers, 50 great artillery carriages, drawn by 100 pairs of oxen, with 100 men to attend to them, and 100 other carts carrying 200 cerbatanes (small cannon), drawn by 400 horses.

Charles VIII. of France, in his expedition to Naples in 1494, at the head of 30,000 men, took with him 140 heavy guns, 200 bombards, and 1,000 arquebuses, each weighing 50 lbs.

Mortars, which have been supposed by some writers to have been a comparatively late invention, were probably the earliest forms of ordnance used. Colonel Chesney, in his work on fire-arms, says that Arab writers state that gunpowder was first applied to projecting stones from cavities made in the rocks, which acted as mortars. At Gibraltar similar contrivances have been tried, and also in the ice at St. Petersburgh.†

In France, Louis XI. and Charles VIII. effected great improvements in the organization of artillery. Their efforts were well followed up by Louis XII., and also by Francis I., who adopted a shorter and lighter construction of field gun, mounted on good carriages and drawn by good horses.

Among the Kings of England, next to Edward III., Henry VIII. seems to have contributed in the greatest degree to the early improvement of fire-arms, to which he personally devoted much attention. He was himself the inventor of several contrivances relating to guns.

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* Gibbon's "Decline," &c., cap. l.

† Shells or incendiary projectiles resembling shells were used in Europe before gunpowder was known. The Greek fire was enclosed in glass or other vessels, and thrown from catapults or other machines. Leo VI., Emperor of the East, surnamed the Philosopher, in his work on military institutions, written about A.D. 900, says, "We have divers ways of destroying the enemies' "ships, as by means of fires prepared in tubes, from which they issue with a "sound of thunder, and with a fiery smoke that burns up the vessels on which "they are hurled. A tube of tin must be put on the prow of a ship to hurl "this fire. Above everything vessels full of inflammable materials must be "prepared which will break when they fall, and set on fire the ship."
See Institutions Militaire de l'Empereur Leon. Translated by M. Mauzeroy, 1778. B. ii. p. 137. Figuier, p. 307.

Mr. Froude says in his history, " Henry VIII. was one of " the first men to foresee and value the power of artillery. " Sebastiani mentions experiments on the range of guns which " were made by him in Southampton water; and it is likely " that the cannon used in the siege of Maynooth were the " large-sized brass guns which were first cast in England in the " year of its capture. When the history of artillery is written, " Henry VIII.'s labours in this department must not be for- " gotten. Two foreign engineers, whom he tempted into his " service, first invented 'shells.' One Peter Baud, 'a Frenchman- " ' born,' says Stowe, 'and another alien, called Peter Van Collen, " ' a gunsmith, both the King's feed men, conferring together, " ' devised and caused to be made certain mortar pieces, being " ' at the mouth from eleven inches unto nineteen inches wide, " ' for the use whereof they [also] caused to be made certain " ' hollow shot of cast iron, to be stuffed with fire-work or wild- " ' fire, whereof the bigger sort for the same had screws of iron " ' to receive a match to carry fire kindled, that the firework " ' might be set on fire for to break in pieces the same hollow " ' shot, whereof the smallest piece hitting any man would kill " ' or spoil him.'—Stowe's Chronicle, p. 584. State Papers, vol. ii. " p. 237."*

The first efforts of the improvers of artillery were directed to making the pieces less cumbersome and mounting them on carriages, which allowed them to be readily transported; at a later period lightness of construction was carried to an excess. Gustavus Adolphus, who is said to have been the first to use cartridges, employed at the battle of Leipzig, in 1631, cannons made partly of boiled leather, "they consisted of a thin cylinder of beaten " copper screwed into a brass breech, whose chamber was " strengthened by four bands of iron. The tube itself was " covered with layers of mastic, over which cords were rolled " firmly 'round its whole length, these were equalized by a layer " of plaster; and a coating of leather, boiled and varnished, com-

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* Frowde, History of England, vol. ii. p. 300.

" pleted the piece. The carriage and piece were so light that two " men were sufficient to draw and serve this kind of gun, which, " as may be imagined, could only bear a small charge."*

The employment of lighter pieces naturally led to the adoption of portable fire-arms or small arms. They were first merely tubes, which were fixed on a wooden post or rest, and there fired with a match. The tubes were next fixed in a rude stock, but were long made so heavy as to require a rest, and many contrivances were employed to turn the rest to account, and make it serve as a pike or form part of a bristling defence to repel cavalry.

As soon as the barrel was fixed in a stock, and made portable, the matchlock was applied to it; this was succeeded about the time of Henry VIII. by the wheel lock, which continued to be used down to the reign of Charles II., when the flint lock was introduced, which has in our own time been superseded by the percussion system.

The manufacture of gunpowder appears at first to have been limited to a simple mixture of the three ingredients, charcoal, sulphur, and saltpetre, in various proportions.† It was at first employed in the state of meal powder. The practice of using corned or granulated powder was adopted in the reign of Charles I.‡ It has been asserted by Camden and others, that the gunpowder used by the English was imported from abroad down to the reign of Elizabeth, when it was first manufactured in this country. This is not correct, for Richard II., in the first year of his reign, 1378, directed Thomas Norwich to purchase among other things two great and two lesser ingenia vocata canons, 600 stones for the same, and for other engines, also 300 lbs. of salt petre, 100 lbs. of sulphuris vini [vivi], and one doleam of carbonum de Salugh [willow charcoal] Rymer Fœdera, v. 7, p. 187.

Richard III., in the year 1484, gave one John Bramburgh an order to make " certain great stuffe of gunpowder." The order is dated January 28. See Harl. MSS. p. 185.

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* Histoire, &c. des trois Armes, par Capitain Favé. Paris 1845, pp. 80, 81. Histoire de la Technologie des armes, à feu." Tome 1, p. 77. Col. Chesney, p. 57.

† See Grose Mil. Antiquities for various proportions used at various periods.

‡ Seaman's Dictionary, by Sir Henry Manwayring, art. Powder. Wilkins on Engines of War, p. 148.

The most important improvement that has been made in fire-arms, since they were first invented, has, doubtless, been the adoption of the rifle barrel, whose introduction, as a military arm, Mr. Robins prophesied in 1743–4, would produce effects little less wonderful than those caused by the first introduction of fire-arms.

The first Patent relative to rifled arms was taken out in England by one Arnold Rotsipen in 1635; but rifles appear to have been made at least 100 years before. It was not, however, until a very late period that the advantages of the rifle were fully appreciated, and its capabilities properly developed.

The great improvements that have been recently adopted in the construction of rifled, revolving, and breech-loading fire-arms, and of rockets and various projectiles, are well known, and full particulars respecting them may be learned from the several Specifications referred to, under their respective heads, in the Index at the end of this work. These not only give an account of what has been done already, but they anticipate, as it were, the history of progress, and point out the course which it will take for many years to come.*

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* This is the case not only with this subject, but with every branch of the arts and manufactures in which improvements are discovered. All except a very few isolated instances, are made the subject of Letters Patent, and full descriptions of their nature, and the extent to which the makers of them hope to carry them, are contained in the Specifications, which thus not only give an account of the past and present state of improvements, but inform us of what may be expected in the way of general advancement for the future.—B. W.

A.D. 1588, January 25.

EVELYN, George, WILLES, Richard, and EVELYN, John.—Saltpetre for gun-powder. A licence granted to digg and worke for salt peter within the realme of England and Ireland, as well within his M a^{ties} owne proper landes & possessions, as also within the lands and possessions of anie hisMa ^{ties} subjects, except the citie of London & twoe myles distant rounde aboute, & the counties of Yorke, Northumberland, Westm'land, Cumberland, and the Bishoppricke of Durham, during the terme of eleven years, & with this ꝑviso that they make upp againe and lay all such places as shalbe by them digged in as good state as they found the same. Subs. by the L. Treas. and prouved by M^{r} Windebancke.

[Printed.]

A.D. 1592, October.

HOXTON, Reynold.—Powder and shot flasks. A prevyledg graunted for the making of flasks, bothe for touch boxes, powder boxes, and bullet boxes for the muskett, calyver, and other small shott, for the space of 15 yeares, suche as have not bene heretofore devised, by the help whereof any (be he never so unskillfull, may charge any such peece with a just proportion of powder and bullett at one instant, without removing his hand, or danger of fireing of himself or any of his fellowes.

[Letters Patent, printed.]

A.D. 1604, October.

EVELIN, John, HARDING, Richard, and EVELIN, Robert, Esqs.—Gunpowder. A grant for 21 years for the furnishing of his Highness' store of gonnepowder, that they, their executors, assignes, and deputies, during the said terme may make within England and Ireland all manner of saltpeter and gonnepowder; and that they may enter, break up, and digge in all convenient places for saltpeter, they repayring such places again, with authority to take carts after 4^{d} the mile, not compelling them to travell above IX. miles, nor laden with more waight than 20^{c} to the lode, with other clauses for performance of the service, and a proviso; lastly, that upon 2 years warning the said graunt to be voyd,

" offenders therein may receive condigne punishment for the " same," power being given to the Courte of Excheq̃ to inflicte such punishment, fyne, and imprisonment as to the said Courte shall " be thought meete."

No Specification enrolled.

[Letters Patent, printed, 3*d.*]

A.D. 1634, May 12.—N° 69.

NEADE, William, and NEADE, William, his sonne, obtained Letters Patent for 14 years, for " certen engins for affixing " the bowe together, and a newe quiver for the arrowes."

No Specification was enrolled.

[Letters Patent, printed, 3*d.*]

A.D. 1635, June 24.—N° 71.

ROTSIPEN, Arnold, obtained Letters Patent for 14 years, " if " he live soe long," for framing and makinge engines for, among other things, " to make bullets or globes of iron, steel, stone, " glasse," or other material, in 3 severall manners.

" To draw or to shave barrells for pieces of all sortes, straight, " even, and smooth," and " to make anie crooked barrell perfectly " straight with greate ease," and " to rifle, cutt out, or screwe " barrells as wyde or as close or as deepe or as shallowe as shalbe " required, and with greate ease." The other engines were to be used for cutting, polishing, filing, turning, boring, grinding, sawing, and planing metals; also for cutting screws and toothed-wheels; also for cutting files; also for a pressinge or printinge engine; also for a hammer mill.

No Specification was enrolled.

[Letters Patent, printed, 3*d.*]

A.D. 1636, April 22.—N° 91.

VERNATT, Sir Phillibert, obtained Letters Patent for a sure waye for the makeinge and workeing of iron, steele, brasse, copper, and other metals, and for casting of ordinance, and doing other workes of like nature by the use of sea coale, pitt coale, or stone coale, instead of wood charcoale.

No Specification enrolled.

[Letters Patent, printed, 4*d.*]

A.D. 1636, July 9.—N° 97.

STONE, Benjamin, obtained Letters Patent for the art of "true "forging, hardening, grinding, glasing, tempering, and workeing "by the helpe of mill or mills," blades for swords, rapiers, and rests of musketts and other blades. In the Patent is a clause prohibiting any one from counterfeiting or imitating the Patentee's trade-mark, "the bunch of grapes," on "payne of forfeyture" of all blades so stamped. There is also a clause giving to the Patentee right of search in case of suspected infringement.

No Specification was enrolled.

[Letters Patent, printed, 4*d.*]

A.D. 1661, February 18.—N° 131.

WORCESTER, Edward, Marquis of, obtained Letters Patent for, among other things, "an invencon to make certeyne guns or "pistolls which in the tenth parte of one minute of an houre may, "with a flaske contrived to that purpose, be re-charged the fourth "part of one turne of the barrell, which remaines stiil fixt, fasten-"ing it as forceably and effectually as a dozen thrids of any scrue, "which in the ordinary and usual way require as many turnes."

No Specification was enrolled.

[Letters Patent, printed, 4*d.* See Register of Arts and Sciences, vol. 3, p. 237; Stuart's Anecdotes of Steam Engines, vol. 1, p. 41.]

A.D. 1662, March 24.—N° 136.

WEYMS, James, and James WEYMS, his sonne, obtained Letters Patent for a "newe waye of makeing light ordinance, "shooting from a quarter of a pound bullett to a demmy cannon, "a traine whereof of seaventeene peices was tryed" (in the presence of the King, Charles II.,) "by a councell warre with peeces "of brass of like calliver;" also for a plan of draining mines and raising weights.

No Specification was enrolled.

[Letters Patent, printed, 4*d.*]

A.D. 1664, March 3.—N° 143.

HILL, Abraham, obtained Letters Patent for, among other things, "a new way of makeing of a gun or pistoll, the breech "whereof rises upon an hindge by a contrivance of a motion

" from under it, by wich it is alsoe let downe againe and bolted " fast by one and the same motion; and alsoe of another gun or " pistoll, which hath a hole att the upper end of the breech to " receive the charge, which hole is opened or stopped by a peece of " iron or steel that lies along the side of the peece, and moveable " by a ready and easy motion; and alsoe of another gun or pistoll, " which is charged and primed at a hole under the sight or visier, " at the upper end of the breech, and shutts within with a cartridge " or roundish plate of iron, and without with the sight or " visier; and alsoe of another gun or pistoll, which is charged and " primed in like manner at a hole below the sight or visier, which " is shutt by a screw smaller below than above; and alsoe of " another gun or pistoll for small shott, carrying seaven or eight " charges of the same in the stocke of the gun, which is lett into " the gun by thrusting forward the sight, and by a square " cartridge within the peece neare the breech, so that the powder " being put in by a hole under the sight, both for chargeing and " primeing the same, together with a touch hole, being shutt both " within and without by thrusting back the sight to his place; and " alsoe of a powder horne or box, which opens by pressing with " the finger the end of the charge or allowance, and shuts by a " spring within it," &c.

No Specification enrolled.

[Letters Patent, printed, 4*d.*]

A.D. 1682, February 16.—N° 216.

CARDIFF, CHARLES, obtained Letters Patent for "an expedient " with security to make musketts, carbines, pistolls, or any other " small fire armes, to discharge twice, thrice, or more, severall and " distincte shotts in a singell barrell and locke, with once priming, " and with double locks oftener, reserving one or more shotts till " occasion offer," whereof "the mistery or maine lyeing in the " charge."

No Specification was enrolled.

[Letters Patent, printed, 3*d.*]

A.D. 1691, September 15.—No. 274.

PHILIPS, THOMAS, obtained Letters Patent for a new sort of mould, "which will last many yeares, and may be ready prepared " at all times for all sorts of advance."

No Specification enrolled.

[Letters Patent, printed, 3*d.*]

A.D. 1692, February 29.—N° 291.

ADDISON, THOMAS, obtained Letters Patent for using sea coale or pitt coale to melt iron oare and make the same into "gunns, bulletts, and othor utensils."

No Specification enrolled.

[Letters Patent, printed, 3*d.*]

A.D. 1692, September 22.—N° 303.

DALLOWE, PHILIP, obtained Letters Patent for "the makeing "of granado shells of glasse, which for cheapness and lightnesse, "and alsoe in point of execution, may be of great use and benefit."

No Specification enrolled.

[Letters Patent, printed, 3*d.*]

A.D. 1693, March 6.—N° 316.

AUSTIN, JAMES, and BALL, FRANCIS, obtained Letters Patent for "a machine or charriot of artillery which is muskett proofe, "and soe contrived as to hold two falkonetts or small field peices, "and two hand-morters to be used by the party sitting in the "charriot, and may be conveyed many miles a day with great ease "and expedic̃on, which hath been seen and approved," &c.

No Specification enrolled.

[Letters Patent, printed, 3*d.*]

A.D. 1694, September 29.—N° 335.

RICHARDS, JACOB, obtained Letters Patent for small engines of "divers kinds, to be used on board any frygatts or merchant "shipps, whereby any number of French or other enemies shall be "destroyed on their boarding any such shipps or frygatts."

No Specification enrolled.

[Letters Patent, printed, 3*d.*]

A.D. 1699, June 20.—N° 364.

HEMING, EDMUND, obtained Letters Patent for "a new in-"venc̃on, very usefull for all our artillery carriages, waggons, and "carts;" also a new engine for sweeping the streets, also greens and walks, and loading the dirt, dust, or soyl, with great ease and quickness.

No Specification enrolled.

[Letters Patent, printed, 3*d.*]

A.D. 1717, May 15.—Nº 418.

PUCKLE, James.—" Portable gun or machine, called a Defence."

The gun is a revolver, and is mounted on a tripod, it has a single barrel and a rotating chamber-piece, consisting of short cylinders fastened round a hollow centre, which works on a horizontal pin attached to the barrel. Several sets of chamber-pieces, each containing six or more chambers, may be used with the same barrel, so that as soon as all the charges of one set have been fired from one chamber-piece, it is unscrewed from the fixed pin or axis on which it revolves, and another chamber-piece, ready charged, is put in its place. The shapes of the chambers and of the bullets may be varied, some "for shooting square bullets against Turks," others for shooting "round bullets against Christians."

[Printed, 5½*d*. See Rolls Chapel Reports, 6th Report, p. 155.]

A.D. 1721, August 12.—Nº 434.

CHAUMETTE, Isaac de la, obtained Letters Papers for, among other things, "a cañon or piece of ordnance, which, being " charged by the breech through the barrel, is cooled by charging " it, and cleaned by firing it. It carries twice as farr as those " comonly in use, and requires but halfe the quantity of powder " and halfe the length of an ordinary cannon, and does not recoyle, " it is very usefull, especially at sea, where the gunners will not be " exposed as they now are in loading the guns, and it may be fired " ten times as often as the cannon now used, which will render " a ship or a place unapproachable." Fusils and pistols of the like make, and having the same advantage. Also case pistols, of which a carbine may be made. Also a bomb or granado, with a time fuse that does not discover its tract in the air by its fire. Also " for swords which serve as bayonetts, by means of a ring at the pummell, and a screw at the hilt." Also powder-flasks that make the charge always just, "by a conservatory, without any spring." Also a "turning matress fit for armies and hospitals that " lasts four times longer than the ordinary ones, on which a man " may turn and shift at pleasure and with ease." Also light full " proof breast-plates, &c. Also a gunlock and rest.

No Specification enrolled.

[Letters Patent, printed, 4*d*.]

A.D. 1728, October 5.—N° 503.

BROWNE, HENRY.—"New method of making cannon." The bore of the cannon is made of varying diameter alternately contracting and expanding. The expanded parts are intended to offer no resistance and to lessen friction, while the narrow parts are to guide the course of the projectile.

[Printed, 3½*d.* See Rolls Chapel Reports, 6th Report, p. 155.]

A.D. 1741, June 4.—N° 577.

HADLEY, GILBERT.—"A piece or ordnance or cannon." The piece is breech-loading and is made of brass or ordinary gun-metal, and the bore goes quite through from muzzle to breech. "There "is a hole athwart or across the cannon towards the breech or "hinder part thereof." Into this is fitted a pin or plug which is withdrawn to admit the charge and thrust in to close up the breech when the piece is fired. "Or otherwise, there is a rowler fitted to "turn in the said thwart or cross hole, which rowler hath a hole "through athwart it of the same size in diameter as the bore of "the cannon." When the piece is to be charged the hole in the "rowler answers the bore," but when turned about a quarter part round the "rowler becomes a full stopper of the bore." This is the earliest specification which describes the tap or "faucet prin"ciple" of construction for breech-loading guns. This construction has been frequently made the subject of subsequent Letters Patent.

[Printed, 2½*d.* See Rolls Chapel Reports, 6th Report, p. 156.]

A.D. 1753, May 13.—N° 683.

VILLERS, LOUIS FLORENT DELAUNOY DE.—"A new method "of making gun carriages of cast iron." Gun carriages made of cast iron are shewn in the drawing annexed to the Specification. Two side frames are connected by cross bars and support the piece. The frames are mounted on three wheels.

[Printed, 5½*d.* See Rolls Chapel Reports, 6th Report, p. 127.]

A.D. 1758, April 21.—N° 723.

WILKINSON, ISAAC.—"A new method or invention for casting "of guns or cannon," &c. The mould is formed of sand rammed wet into a number of iron boxes in which the pattern is placed. The iron boxes are then separated and the sand in them is dried in an oven and faced with wet charcoal dust or black lead. They then are ready for being put together for use. The moulds should be fluted or have holes for the escape of air.

[Printed, 2½*d*. See Rolls Chapel Reports, 6th Report, p. 129.]

A.D. 1758, June 29.—N° 725.

RAMINGER, HENRY.—Shot and bullets made exactly round and solid. The lead is purified by melting red led with one-third of its weight of calcined flints beaten with whites of eggs and egg-shells. The shot or balls are cast and made round by passing them through a cutting engine with steel rollers.

[Printed, 2½*d*. See Rolls Chapel Reports, 6th Report, p. 157.]

A.D. 1761, August 5.—N° 765.

REMNANT, STEPHEN.—"Gun carriages of cast iron of an "entire new construction." The construction is described in a plan annexed to the Specification, which shows a cannon mounted on two cast-iron side frames bolted together and mounted on four trucks.

[Printed, 5½*d*.]

A.D. 1762, June 8.—N° 776.

EDGELL, JAMES.—"A shooting belt." The belt is fastened round the body. A metal case is attached to the belt so constructed that when pulled off from the belt it contains one charge which is separated from the ammunition left in the belt by a slide.

[Printed, 3*d*. See Rolls Chapel Reports, 6th Report, p. 132.]

A.D. 1766, April 22.—N° 846.

DELAVAL, THOMAS.—"Making gunpowder from sulphur stones," &c. Saltpetre, sulphur stones, with a small portion of sulphur, are to be prepared with any kind of spirits without the use of charcoal.

A flux for making glass is also described.

[Printed, 2½*d*. See Rolls Chapel Reports, 6th Report, p. 134.]

A.D. 1772, February 4.—N° 1003.

WRIGHT, THOMAS, and BYRNE, CHARLES.—"A new con-"struction of guns and all other fire arms," &c. A plan which is annexed to the Specification shews a hammer connected by a chain with the arch so as to put down the hammer when the lock is cocked. It also shews many methods of loading at the breech, the barrel being capable of being detached from the breech piece or fastened thereto by springs or catches or screws.

[Printed, 5½*d.*]

A.D. 1774, January 27.—N° 1063.

WILKINSON, JOHN.—"A new method of casting and boring "iron guns or cannon." The gun or cannon is cast solid. It is to be turned round by a wheel "moved by water or by the applica-"tion of a fire-engine," and pierced by drills and bored by a boring bar carrying cutters.

[Printed, 2½*d.* See Rolls Chapel Reports, 6th Report, p. 162. The boring machine of the patentee, an ironmaster of Brosely, was the first machine capable of boring cylinders with sufficient truth to enable Watt to use them for his steam engine.]

A.D. 1775, April 8.—N° 1095.

NOCK, HENRY, JOVER, WILLIAM, and GREEN, JOHN.—"New invented firelock," &c. The lock is fitted in the stock and entirely concealed. The pan is made waterproof, and the smoke from the priming is carried off by a tube in the stock.

[Printed, 2½*d.*]

A.D. 1776, December 2.—N° 1139.

FERGUSON, PATRICK.—"Improvements upon fire-arms," &c. The Specification and "plans" describe breech-loading guns in which a screw plug is used, which, by a turn, is made to rise so as to fill up the bore, and may be made to descend by one turn in the contrary direction; or the charging chamber may be closed by a slide, or by a revolving perforated plug like that of a tap. The plug may be turned by the trigger guard. A raised part is also attached to the breech to form a sight, which is made on the sliding principle.

A section of a rifle barrel is also shown in which the grooves are made very wide compared with the "lands," which form narrow ribs.

[Printed, 6½*d.*]

A.D. 1777, November 28.—N° 1173.

RAWLE, William.—Instruments for carrying soldiers' cartridges. The Specification and drawings describe boxes and pouches made of metal plates covered with leather, having numerous divisions therein for the reception of cartridges.

[Printed, 5½*d.*]

A.D. 1779, April 10.—N° 1218.

BLIGHT, Richard.—"Cannon and guns and gun carriages." The plan annexed to the Specification shows a cannon which is discharged by a flint lock attached to the cascable.

The cannon is raised by a windlass working a toothed wheel, with a paul attached. It is made to turn on an iron plate.

[Printed, 5½*d.*]

A.D. 1779, September 7.—N° 1233.

BEYER, Christopher.—"A spiral wedge for the purpose of "elevating, pointing, and lowering of cannon," &c. The wedge acts as a circular incline, and the gun is elevated or depressed by allowing the breech to rest on the lower or higher parts of the wedge, which is adjusted by turning it round on a vertical axis.

[Printed, 5½*d.*]

A.D. 1780, December 5.—N° 1270.

AITKEN, John.—"A new method of loading" guns with two or more charges. Several charges are placed in the same barrel, separated by wads, and are fired one after the other through different touchholes by a lock or match.

[Printed, 2½*d.* See Repertory of Arts, vol. 6, p. 239.]

A.D. 1781, March 9.—N° 1284.

WATERS, John.—"Pistols with a bayonet." The pistols have one or more barrels, and to each a knife or bayonet may be connected by a spring, slide, hinge, or otherwise.

[Printed, 2½*d.*]

A.D. 1782, December 10.—N° 1347.

WATTS, William.—"Making small shot solid throughout, "perfectly globular in form," and smooth, &c.

About 20 cwt. of soft pig lead may be melted with about 40 lbs. of white or yellow arsenic, and run into bars or ingots of "slag or poisoned lead." Another charge of 20 cwt. of pig lead is then melted, and about three-quarters of a cwt. of scum are taken off and put in a pot with a bar of slag or poisoned lead and melted. The fluid metal is dropped into water from a height of about two inches; if it does not drop in a round form more slag is to be added until round granules are formed. It is then in a proper state, and may be melted in mass. The scum is taken off and put in an iron or copper frame, with a bottom perforated with holes; the scum is squeezed, and the metal falls from a height of from about ten feet for small shot, to 150 feet for large shot, into water.

[Printed, 2½*d*. See Repertory of Arts, vol. 3, p. 318; Register of Arts and Sciences, vol. 5 (*new series*), pp. 155 and 157.]

A.D. 1787, April 25.—N° 1598.

NOCK, Henry.—" Breeching applicable to all kinds of guns and " other fire-arms," &c. The touchhole is made in the breech, in the front of which is a cup-shaped chamber open to the barrel, and ommunicating with the touchhole. The breech, commonly called the patent breech, is screwed on its outside to fit the inside of the barrel.

One or two moveable screws are fitted into the breech, which may be removed to give access to the chamber.

[Printed, 4½*d*. See Rolls Chapel Reports, 6th Report, p. 176.]

A.D. 1787, September 17.—N° 1621.

ROSE, John.—" Preparing steel, &c., for buckles, sword hilts," &c. The Specification describes modes of manufacturing polished steel, buttons, buckles, sword hilts, &c.

[No Specification enrolled.]

A.D. 1788, February 5.—N° 1639.

WARING, Thomas.—" Improvements in the manufacturing long bows," &c. The bow is placed in a frame and bent backward by a screw; in that position the back is glued or veneered to it.

[Printed, 5½*d*.]

A.D. 1788, August 26.—Nº 1668.

COOK, Henry.—" Elastic spunge for spunging great guns and " other fire-arms," &c.

The head on which the sponge is fitted may be formed of elm or other wood or material of a conical form. It is covered with canvass, and upon that wool or hair is sewn with oiled twine, which is combed and clipped down. The wool is then smeared and well impregnated with a composition of equal quantities of red lead or white lead and powdered glass, mixed with linseed oil.

[Printed, 2½*d.* See Rolls Chapel Reports, 6th Report, p. 179.]

A.D. 1789, July 30.—Nº 1694.

WILKINSON, John.—" An improvement in the method of " making cannon, or any other piece of ordinance made of metal, " together with its shot, shell, or arrow," &c.

The barrel of the piece is rifled with two spiral grooves, and the shot or shell have belts or wings to fit the grooves. Or the barrel may have a spiral convex ribs, and corresponding grooves are then to be cut in the projectiles.

[Printed, 2½*d.* See Rolls Chapel Reports, 6th Report, p. 181.]

A.D. 1789, November 6.—Nº 1707.

TEMPLEMAN, James.—" Making locks to discharge double-" barrel guns and pistols by means of one trigger only, without " any possibility of discharging both barrels at the same instant," &c. The Specification and drawings, which should be referred to, describe flint locks having an arrangement of double levers acting on two sears, each of which may be held by a bent or catch while the trigger actuates the other.

[Printed, 6½*d.* See Rolls Chapel Reports, 6th Report, p. 181.]

A.D. 1791, November 28.—Nº 1837.

SEARLES, James Sturman.—" Improvements on the trigger of " a gun," &c. The Specification and drawings, which should be referred to in order to comprehend the invention, describe a peculiar construction of flint lock and trigger.

The trigger has two motions, one direct and the other lateral, the latter, in the case of a double lock, discharges one of the barrels.

[Printed, 4½*d.* See Rolls Chapel Reports, 6th Report, p. 145.]

A.D. 1791, November 28.—N° 1838.

BENTHAM, Samuel.—"A new method of planing wood." This is one of the earliest inventions of labour-saving machinery for working wood. The method of planing by a broad moveable cutter, and by several cutters, is described, and modifications are shewn which may be used for roughing out gunstocks.

[Printed, 4½*d.* See Repertory of Arts, vol. 5, p. 293; Practical Mechanics' Journal, vol. 2, p. 274.]

A.D. 1792, April 18.—N° 1865.

MANTON, Joseph.—"A hammer on an improved principle for "all kinds of fire-arms, and also an improved breech for all kinds "of double and single barrelled guns and pistols."

The Specification and drawings describe a hammer with a concave face for a flint lock. Also a breech piece made on the break-off principle. It is filed on its outside "to admit the lock nearer "the centre of the barrell."

It has a touchhole countersunk or cupped, and a powder chamber wide in front and narrower in the rear, communicating with the touchhole by a short passage.

[Printed, 4½*d.* See Rolls Chapel Reports, 6th Report, p. 185.]

A.D. 1792, July 5.—N° 1893.

MANTON, Joseph.—Improved trigger and wadding for guns and pistols. "The trigger has a spring screwed to the frame, the "end of the spring is turned to act through a notch in the trigger," whereby the trigger is kept close to the rear of the lock by the spring, and is prevented from shaking.

The wad is made of wood or suitable material, and is made in front cup-shaped, and has a shoulder, if requisite, behind, to which the cartridge may be attached.

[Printed, 4½*d.* See Rolls Chapel Reports, 6th Report, p. 186.]

A.D. 1792, July 5.—N° 1897.

WILSON, James.—"Improvement in the construction of fire-"arms," &c. These relate to flint locks which are made with covers to the pans, so constructed as to keep out the wet.

[Printed, 3½*d.* See Repertory Arts, vol. 6, p. 304.]

A.D. 1793, April 23.—N° 1951.

BENTHAM, Samuel.—" Improved methods and means of working wood, metal," &c.

The Specification describes a mode of making tubes of metal, gun barrels, and cannon by twisting thin laminæ of metal spirally round a mandril and welding them.

Also reciprocating saws for sawing straight and curved work in wood and also in metal; also methods of bending wood into any required shape, as for ship timbers by the steaming process; also circular saws and cutters of different shapes for cutting mouldings which are applicable for sawing gunstocks.

[Printed, 9½*d.* See Repertory of Arts, vol. 10, pp. 221, 293, and 367, vol. 13 (*enlarged series*), p. 395.]

AD. 1794, February 4.—N° 1978.

SYKES, Thomas.—" A lock, instrument, or machine, with one " tricker or bolt, whereby both locks of a double-barrel gun, " pistol," &c., may be fired " one after the other, or one alone," &c.

The Specification and drawings, to which it is necessary to refer, describe a double flint lock, with a single trigger.

[Printed, 4½*d.*]

A.D. 1795, February 28.—N° 2041.

BOLTON, George.—" An improved gunlock for muskets, " pistols, and other fire-arms."

The Specification and plan annexed to it describe a flint lock, consisting of two side plates, the various parts being supported on pins going through both, without requiring screws.

[Printed, 4½*d.*]

A.D. 1795, February 28.—N° 2042.

WEBB, Richard.—" A considerable improvement in the con" struction of guns and other fire-arms," to prevent accidents.

The Specification and plan annexed to it describe a flint lock so constructed that the flint strikes the hammer at least 6½ inches from the finger, drawing the trigger, so that danger from a gun bursting is lessened, the distance between the hand and breach being so great.

[Printed, 6½*d.*]

A.D. 1795, October 22.—N° 2072.

GROVE, Jonathan.—" A gunlock or lock for guns or fire-arms " of a new construction."

The Specification and drawings describe a flint lock having a coiled main spring like that of a watch.

[Printed, 5½*d.*]

A.D. 1796, December 8.—N° 2151.

GOVER, John.—" New invented carriage for all sorts of cannon."

The Specification and drawings describe an under carriage, with or without trucks, having an inclined plane adjustable by a rack, and an upper carriage sliding on the incline of the under carriage.

[Printed, 6½*d.* See Rolls Chapel Reports, 6th Report, p. 192.]

A.D. 1797, March 14.—N° 2173.

SIDDON, William.—" A new method of screwing and fastening the hammer springs and sear springs to gunlocks and pistol-" locks."

The Specification and drawings describe a flint lock with the hammer spring placed outside.

[Printed, 5½*d.*]

A.D. 1797, April 12.—N° 2178.

MANTON, John.—" Certain new improvements in the construction of guns and pistols of every description."

The breach is made to screw on the outside of the barrel, instead of into its interior; also flint locks are described having one " tricker " for discharging two locks.

[Printed, 3½*d.* See Rolls Chapel Reports, 6th Report, p. 192.]

A.D. 1798, March 20.—N° 2224.

HAYCRAFT, Joseph.—" A gun carriage of an improved con-" struction."

The Specification and plan annexed to it describe a carriage, made in two parts, the upper one sliding upon the inclined surface of the under one.

The under carriage runs on rollers, which are locked when the piece is fired, or the carriage may be held in its place by a bar screwed down through it. The traversing motion is effected by a conical wheel, whose axis is at right angles to those of the rollers. The carriage is raised and made to bear on this wheel, by means of a bent lever or hand spike fixed at its rear end.

[Printed, 4½*d*. See Repertory of Arts, vol. 12, p. 16.]

A.D. 1798, July 23.—N° 2252.

DUPE, William.—" A method of manufacturing bars of a mix-" ture of iron and steel proper for double-barrel gun barrels. Two " round rods of iron (less in diameter than the calibre of the " intended barrels) are each covered with steel, of the same thick-" ness as the proposed size of the barrels. The two rods thus pre-" pared are laid together lengthways and surrounded with iron, " steel, or iron and steel mixed. The whole is then perfectly welded " and brought into a bar." The bar is then bored so as to take out the iron rods or cores, and so leave the steel. The outer coat of iron and steel is also " wasted away in the fire," or filed away, so as to make the barrels to consist entirely of steel, or some iron may, if requisite, be left on the outside.

[Printed, 2½*d*.]

A.D. 1799, November 28.—N° 2360.

THOMASON, Edward.—" Improvements in the mechanism of " the cocks of gunlocks," &c. These refer to flint locks, in which the flint is made, by the operation of cocking, to present a different angle to the hen or hammer every time the piece is fired.

[Printed, 4½*d*.]

A.D. 1800, July 24.—N° 2428.

POGGI, Anthony Cesari de.—" Improvements in the con-" structing and using of ordnance to be employed both in the sea " and land service now in this kingdom, but in part known and " used in foreign parts."

The Specification is unaccompanied by drawings; it contains descriptions of guns and carriages with side cheeks in the form of quadrants of a circle, having bolts through them, and screw apparatus for elevating and depressing the piece. Also apparatus for breaking the recoil by locking the wheels, and for running up the piece by a winch; also polygonal trunnion holes; also a sliding carriage; also a mortar with a conical chamber, the bottom terminating in a hemisphere in which is screwed a mass of copper having a very small conical chamber communicating with the vent. The mortar is fixed on a wooden bed, and is elevated by a screw.

[Printed, 4½d. See Repertory of Arts, vol. 1 (*second series*), p. 169; Rolls Chapel Reports, 6th Report, p. 117.]

A.D. 1800, August 2.—N° 2436.

GILL, THOMAS—" A new and improved mode of rifling the bores " or calibre of cannon, and of musket, carbine, gun, and pistol " barrels."

The Specification and drawings describe apparatus whereby as many as twenty barrels may be rifled at a time. The barrels are carried in a frame which has a reciprocating motion; the cutter rods have no reciprocating motion, but are turned on their axes, to give the spiral shape to the groove.

[Printed, 6½d.]

A.D. 1800, December 9.—N° 2654.

PROSSER, JOHN.—"A waterproof pan and hammer for gun and pistol locks, also a breach for gun and pistol barrels for the purpose of a quicker and more forcible explosion of the powder."

A flint lock is described, in which the hammer has a heel to prevent its being struck too far back, and the hammer and pan are so shaped as to throw off any water that may fall upon it. The breech is made in two parts, screwed one into the other, and has an oval chamber, constructed at its fore part to prevent the ramrod from entering and ramming the powder too tightly.

[Printed, 4½d.]

A.D. 1801, January 23.—N° 2466.

VAZIE, ROBERT.—"An improvement in the construction and " application of a gun," &c.

The Specification and drawing describe:

1st. A furnace and boiler for working a forge hammer.

2nd. A gun which has a chamber closed by a slide placed behind the breech for containing priming for a flint lock.

3rd. A saddle for a horse, which is constructed to carry a swivel gun.

4th. Clamped shoes to enable the horse to stand the shock of the discharge, and sandals or strips of felt, which are interposed between the shoe and the hoof of the horse.

[Printed, 6½*d.* See Repertory of Arts, vol. 16, p. 3; Rolls Chapel Reports, 6th Report, p. 199.]

A.D. 1801, December 16.—N° 2566.

GRIERSON, CHARLES.—" A breech or lock for single and double " barrel guns, &c." The outside of the breech is made in a taper form, so as to afford a short passage from the pan in flint locks, to the charge in the barrel. Also the locks in double barrel guns are thereby brought nearer together.

[Printed, 4½*d.*]

A.D. 1802, January 16.—N° 3573.

HALL, JOSEPH.—" A patent or new invented hammer for guns " and pistol locks," &c. The locks are flint locks; the hammer is made with a chamber in the back of it perpendicular to the pan, to contain the priming-powder.

[Printed, 2½*d.* See Repertory of Arts, vol. 22 (*second series*), p. 203.]

A.D. 1802, October 30.—N° 2652.

BRAHMAH, JOSEPH.—Machinery for shaping wood, making gunstocks, &c. No drawings are annexed to the specification. Cutters, or tools of the shape suitable to the work to be produced are to be employed. These are to be fixed in proper frames with regulating screws, and have reciprocating or circular motions as required; they may be carried on arms fixed to upright or horizontal shafts, proper corresponding motion being given to the work. When upright shafts carrying cutters on arms are used the work may slide beneath them. The upright shaft is to be stepped in a water-tight box, and so turn upon a suitable fluid body therein contained; by injecting fluid from a force pump any superincumbent weight of machinery may be adjusted to any height. An universal regulator of velocity is described. Any number of cog-wheels with varying and progressive numbers of teeth may be keyed on the driving shaft, forming a cone of wheels; a similar number of cog-wheels in inverse order run loose on a parallel shaft. By making the small loose cog-wheels fast, it works in connection with the large fast cog-wheel on the driving shaft, and high speed is obtained; and by making fast the large loose cog-wheel, it is driven by the small fast cog-wheel, and a low speed is obtained; by making fast any one of the intermediate loose cog-wheels, all the others running loose, any intermediate velocity, as required, may be obtained. Apparatus is also described for cutting true spherical convex or concave surfaces.

[Printed, 4½*d*. See Repertory of Arts, vol. 2 (*second series*), p. 104; Practical Mechanics' Journal, vol. 2, p. 274; Smith's Mechanics, vol. 1, p. 101.]

A.D. 1802, November 13.—N° 2658.

SMITH, HENRY.—"Improved vessel or barrel for the more safe "and expeditious carriage and conveyance of gunpowder." The barrel or vessel is made entirely of copper, is quite water-tight, and has a handle over the bung-hole, which is made fast by a lever or wrench to keep it water-tight. Fixed barrels to contain large quantities of powder have a tap by means of which any quantity of powder may be drawn off as required.

[Printed, 3½*d*. See Repertory of Arts, vol. 28 (*second series*), p. 332.]

A.D. 1803, March 23.—N° 2692.

EGG, DURS.—"Improvements upon fire-arms and their locks." The locks are flint locks and have a small centre axle on the tumbler, "which acts in and is supported by a second bridle which goes over the cock fixed outside the lock." The locks may be readily taken in pieces. The pan and hammer are made waterproof, and the hammer has a moveable steel face.

A breech-loader is described: the charge is introduced through a slide in the top of the barrel, which is made to close the hole by a lever motion.

To prevent windage at the touchhole, which is made large, the barrel is allowed to recoil a short distance in the stock, and by this backward movement closes the touchhole. Or this may be done by a slide moved by the hammer. As the barrel slides back in the stock with the recoil, the kick is relieved by a spring. At the breech is fixed a sight with a sliding notched part. A tubular sight with telescope motion may be used.

Pistol-stocks may be made with a support on the upper part acting as a stop against the hand.

Cannon may be fired by the discharge of a pistol at the touchhole thereof, Ramrods are made with a spiral worm round a centre beam like a wood screw.

[Printed, 3½*d*. See Repertory of Arts, vol. 5 (*second series*), p. 321; Rolls Chapel Reports, 6th Report, p. 152.]

A.D. 1803, June 10.—N° 2709.

PECKHAM, JOHN RANDALL.—"An improvement on a lock to "a musquet," &c. Flint locks are made self-priming by means of a box or magazine containing a necessary supply of powder and communicating with the pan by a tube, which is opened and closed at the requisite times by the action of the lock.

[Printed, 2½*d*.]

A.D. 1803, July 6.—N° 2722.

MANTON JOSEPH.—"A hammer of an improved construction," &c. Hammers for flint locks, with grooves and perforations to allow of the escape of the air, are described.

[Printed, 4½*d*. See Webster's Reports, vol. 1, pp. 192, 484, note (*n*); Webster's Patent Law, pp. 11, 30, 118, also p. 128, cases 51 and 53; Carpmael's Reports on Patent Cases, vol. 1, pp. 274 and 278; Davies on Patents, pp. 327 and 333.]

A.D. 1803, December 3.—N° 2744.

SEARLES, JAMES STURMAN.—"Improvements to be applied to "any kind of fire-arms," The Specification and drawings describe a breech-loading rifle with flint lock. The barrel slides in its stocks on a rod attached underneath. "The barrel and stock are "made to part in the same manner as the joint of a flute." A method of fastening a bayonet by a spring and catch, also a globular projectile with a tail, and also a harpoon to be fired at fish, are described.

[Printed, 5½*d*. See Rolls Chapel Reports, 6th Report, p. 202.]

A.D. 1804, February 7.—N° 2750.

THOMASON, EDWARD.—"An improved mode of making pikes." The blades or points of the pikes are made to draw back into a hollow cylinder, and are protruded when required by pulling the handle, or setting in motion suitable apparatus in the cylinder.

[Printed, 5½*d*. See Repertory of Arts, vol. 5 (*second series*), p. 94.]

A.D. 1804, May 18.—N° 2763.

BARTHELEMY, Peter, and SHOUBRIDGE, James.—Shield and armour musket-proof. Plates of iron a sixteenth of an inch thick are sewn together so as to fit the body, and are covered with a sheet of leather.

[Printed, 2½*d*. See Rolls Chapel Reports, 6th Report, p. 202.]

A.D. 1805, December 19.—N° 2803.

GOVER, John.—Improvements in the construction of gun-carriages. The Specification and drawings describe improvements upon the gun-carriage described in a former Specification of Letters Patent, dated December 8th, 1796 (see N° 2151, p. 35). The gun-carriage consists of an under carriage, upon which is an incline adjustable by a jack, and an upper carriage carrying the gun. The upper carriage is made to slide up the incline, to which any requisite angle may be given to resist recoil, and the under carriage may be made like that of an ordinary ship's gun, or may be mounted on wheels like a field-piece.

[Printed, 10½*d*. See Rolls Chapel Reports, 7th Report, p. 189.]

A.D. 1805, January 19.—N° 2810.

KEDDIE, Thomas Hamilton.—" A cartouche box." The cells in the box, instead of being upright are inclined at a convenient angle, and a leathern pocket is attached thereto to catch any cartridges that may be allowed to fall.

[Printed, 2½*d*. See Rolls Chapel Reports, 7th Report, p. 189.]

A.D. 1805, February 28.—N° 2825.

DODD, George.—Improvements in the Royal York gun-lock, other gun-locks, &c. These relate to a mode of rendering locks secure at half cock, and of preventing them from catching as they pass from whole cock to fire the piece. The rear tumbler and trigger are so constructed that pulling the trigger " shall tend " to force the rear nose tighter and firmer into half cock bent or " notch, which is effected by giving the upper part of the trigger " a small inclination to the upper part of the plate."

[Printed, 4½*d*.]

A.D. 1805, July 3.—N° 2865.

WILSON, ALEXANDER.—" Improvements applicable to shot-" belts, powder flasks, and fire-arms," &c. The Specification and drawings describe a breach with an egg-shaped chamber, so that the ball cannot be rammed down too tightly upon the powder; also a flint lock, in which the hammer face is twisted towards the outside, and the flint strikes in an oblique direction; also shot-belts and flasks with safety covers held by springs and rests.

[Printed, 5½*d.* See Repertory of Arts, vol. 8 (*second series*), p. 161.]

A.D. 1805, October 30.—No. 2885.

KENTISH, RICHARD.—" An armour waistcoat." Plates of steel are fastened together with overlapping edges moving one upon the other.

[Printed, 2½*d.* See Rolls Chapel Report, 7th Report, p. 188.]

A.D. 1806, February 20.—N° 2911.

JONES, JOHN.—" Improvements in the mode of manufacturing " barrels for fire-arms." The barrel is made by twisting a skelp with bevelled edges round a mandril, so that the edges overlap each other, and then welding together the edges of the skelp. The skelp is formed by passing a bar through rollers to give it such a shape that its sectional area is of a rhomboidal form, and is made to taper or grow gradually less in area from one end to the other.

[Printed, 5½*d.* See Repertory of Arts, vol. 8 (*second series*), p. 412.]

A.D. 1806, March 13.—No. 2917.

LOGAN, MICHAEL.—" Marine, fort, and field artillery." The Specification describes a mode of constructing gun-carriages so as to present the least possible mark to an enemy's shot, and to contain the least possible amount of material, the object being at the same time to combine great strength and facility for pointing the piece, and regulating the recoil. The carriage is made of iron or wood. The piece is supported on a cast-iron fulcrum by one or two cylinders. The gun is elevated and depressed by a screw, and the recoil is controlled by a chain attached to a fixed roller.

[Printed, 4½*d.* See Repertory of Arts, vol. 14 (*second series*), p. 221; Rolls Chapel Reports, 7th Report, p. 101.]

A.D. 1806, March 21.—N° 2920.

PLACE, Francis.—" Improvements in cocks for muskets, " pistols," &c. The Specification and drawings describe a gunlock, in which " the half-cock bent in the tumbler is cut sufficiently " deep to form a right angle with the centre of the tumbler and sear " pin or screw, the trigger forming a right angle from the trigger " pin to the sear screw or pin."

[Printed, 5½*d*. See Rolls Chapel Reports, 7th Report, p. 191.]

A.D. 1806, May 1.—N° 2932.

BUNDY, William.—" Machines or instruments for the purpose " of making leaden bullets or other shot."

The Specifications and drawings describe machinery for rolling spherical bullets of lead or soft metal. Two steel dies or moulds are used; these are grooved longitudinally, so as to form, when together, a hollow cylinder, tapering from its wide to its narrow end. The upper piece is made to slide longitudinally on the lower one. A long cylinder of lead is fed at right angles to the pieces, and as portions of it are cut off they are pressed and rolled between the grooves in the steel pieces, so as to come out in a spherical shape. A powerful fly-press may also be used to compress the balls. Several pairs of dies or moulds may be worked together by one driving apparatus.

[Printed, 6¼*d*. See Rolls Chapel Reports, 7th Report, p. 102.]

A.D. 1806, September 15.—N° 2966.

MANTON, Joseph.—" Improvement in double-barrelled guns." An elevated top piece or top rib is used; it is made high at the breech, and tapers off to the muzzle, so as to give the barrels elevation and make them " throw the centre of the charge well up," at a distance of about 40 yards.

[Printed, 2¼*d*. See Davis' Patent Cases, p. 333; Webster's Patent Law pp. 11, 30, and 118, (also p. 128, Cases 51 and 53); Carpmael's Reports on Patent Cases, vol. 1, p. 278. The Letters Patent were decided to be invalid in the case of Manton *v*. Manton, tried before the Lord Chief Justice Gibbs in the Common Pleas, June 20, 1815, on the ground that guns of a similar construction had been sent out to India, and also used in England, prior to the date of the Letters Patent.]

A.D. 1806, December 4.—N° 2991.

MATTHEY, JAMES FREDERICK.—"Improvements in fire-arms." These relate to flint locks. The pan is made water-tight, and a magazine for containing the priming powder is attached thereto behind the hammer.

[Printed, 5½*d.*]

A.D. 1807, January 29.—N° 3005.

FRIEND, RICHARD.—"Improvements in the making and working gun and carronade carriages, which improvements are also "applicable to various other useful purposes."

The carriage of the gun is so made that the bottom of it moves upon a slide or platform like the slide of a common carronade, and similarly fixed to a ship's side or other fixed fastening. After the gun has recoiled on the side, it is raised by suitable levers, actuated by cranks and cog-wheels, so as to bring its weight to bear on the axles of two pairs of wheels, upon which it is run forward. It is then let down, so as to rest on the slide as before.

[Printed, 6½*d.* See Rolls Chapel Reports, 5th Report, p. 196; Repertory of Arts, vol. 11 (*second series*), p. 1.]

A.D. 1807, April 8.—N° 3028.

HAWKINS, RICHARD FRANCIS.—"Improvements to all kinds "of gun and carronade carriages," &c., particularly adapted to ships. The guns are run out by means of ropes suitably attached to a barrel or drum, worked by a winch with a ratchet motion.

[Printed, 5½*d.* See Rolls Chapel Reports, 7th Report, p. 196.]

A.D. 1807, April 11.—N° 3032.

FORSYTH, ALEXANDER JOHN.—"An advantageous method of "discharging or giving fire to artillery and all other fire-arms, "mines, chambers, cavities, and places in which gunpowder is put "for the purpose of explosion."

The Specification describes the application of the detonating or percussion principle for exploding gunpowder in fire-arms, &c. Various modes of applying the principle to ordnance and small arms are shown. The detonating powder is put in small quantities in a small cylindrical touch-hole, and is struck by an exploding-rod, or is fed in from a self-acting magazine.

[Printed, 5½*d.* See Webster's Reports, vol. 1, pp. 95, 97; Webster's Patent Law, p. 129, Case 59; Repertory of Arts, vol. 11 (*second series*), p. 401;

Carpmael's Reports, vol. 1, p. 401; Parliamentary Report, p. 198; Chitty's Prerogatives of the Crown, p. 182; Rolls Chapel Report, 7th Report, p. 197. The validity of the Patent was disputed in the case of Forsyth *v.* Riviere, tried before Abbot, C. J., in the King's Bench, June 4, 1819, but it was established, although others had privately used a similar invention before the date of the Patent. Abbot, L. C. J., held that if several persons simultaneously discover the same thing, the party first communicating it to the public is the legal inventor, and entitled to the protection of Letters Patent.]

A.D. 1807, November 12.—N° 3080.

DICKENSON, John.—" A cannon cartridge paper," &c. A certain proportion of wool or woollen rags must be mixed with the linen or other rags used in making cartridge paper, to prevent sparks of fire being retained therein after an explosion. Two-fifths woollen and three-fifths linen rags are proportions recommended.

[Printed, 2½*d.* See Repertory of Arts, vol. 14 (*second series*), p. 83; Rolls Chapel Reports, 7th Report, p. 105.]

A.D. 1808, March 28.—N° 3122.

COOK, Benjamin.—" Making barrels for fowling-pieces, muskets, pistols, and other similar fire-arms, and ramrods for the " same." Iron or steel bars, forged, cast, or otherwise prepared, are drawn between rollers, or otherwise made round or of any required shape. These are cut into suitable lengths, and each piece or carcass is drilled or bored through the whole or part of their length; the piece is then passed through draw-plates or grooved rollers, through gradually diminishing apertures, until it attains the increased length and thickness required. Also plates or scalps of iron may be turned over a mandril, and afterwards welded by passing them through draw-plates or grooved rollers. " In some cases it will be necessary to keep the bar in the barrels " while they are rolled or drawn," &c., " especially where they are " required to be made of octagonal or other form in the bores." Discs of iron or steel may be used; they are first indented, and the indentation is deepened by forcing the piece through apertures of diminished diameter, until they assume the form of barrels, which are rolled or drawn. Barrels for ordnance may be made by the methods above described. For making rifle-barrels the barrels are rolled or drawn with a ribbed or fluted bar inside them; the barrels receive grooves from the flutes of the bar, and are to be afterwards twisted. Ramrods are made by being drawn or rolled, as above described.

(This Specification was cited in the case of Russel *v.* Cowley to shew that the process of welding tubes by drawing was known before Feb. 26, 1825.)

[Printed, 5½*d.* See Webster's Patent Cases, vol. 1, p. 457; Rolls Chapel Reports, 7th Report, p. 107.]

A.D. 1808, May 24.—Nº 3134.

CONGREVE, William.—" A gun-carriage of the simplest con-" struction." The gun is mounted on trucks in such a manner that their centres are as nearly as possible in the plane of the axis of the piece. This may be effected by casting the gun with four trunnions and mounting four trucks thereon. Or two trucks may be mounted on the two trunnions of a gun, and the cascable is supported by a frame running on another truck. The gun may be allowed to recoil on a frame or platform which is attached by a cord to a fixed drum or pulley. The frame may be hinged so as to fold up when not in use; the frame is mounted on trucks so as to give a traverse of about 70° or 90°. The trucks may be locked by a ratchet and paul or in any other convenient way when necessary to lessen the recoil.

[Printed, 1*s.* 2½*d.* See Rolls Chapel Reports, 7th Report, p. 106.]

A.D. 1808, July 30.—Nº 3155.

RICHARDS, George.—" Single and double cannon, carronades, " or ordnance, muskets and all other kinds of fire-arms, and a new " method of charging or loading the same, and of fixing or placing " bayonets on fire-arms." The cannon are made of wrought iron, twisted scalps, or bars, or plates, welded together with double barrels with one touch-hole, to fire chain-shot, one from each barrel, or with separate touch-holes to fire separately. The pieces may be chambered with a conical chamber in one or both barrels; the bores may be plain or rifled, for rifled cannon cast-iron shot are used, " coated with pure tin and iron, with a proper quantity " of lead to suit the chambers " and " to give way to the pressure " of the rifles." Breech loading pieces are made with plugs screwed into the breech, and withdrawn by keys or levers; the plugs may be made to fasten on the lug principle, or with tongues sliding in grooves, and then turned into cross grooves; or the piece is made in two separate parts, dividing behind the trunnions, the breech part, or charging chamber, is supported on axes let into two strong cheeks attached to the trunnions, the cascable is depressed by hand, and the charging chamber moves round its axis, and exposes the fore part to receive the charge, the joint may be plain or the breech part may be inserted on the "spigot and faucet" principle. This mode of construction is said to be applicable to small arms as well as large ordnance. Safe-guard locks are described, wherein the cock is locked by a safety bolt, or a slide is made to cover the touch-hole. A single pendulum trigger is used to discharge two locks, by moving it in alternate directions. Bayonets are made to slide down the inside of the piece when unfixed. Belts are made with cells or tubes to hold cartridges, and a water-proof cover or flap is attached thereto.

[Printed, 5½*d.* See Rolls Chapel Reports, 7th Report, p. 201.]

A.D. 1809, July 25.—N° 3196.

LOGAN, MICHAEL, surrendered his Letters Patent dated January 26, 1809, for "Transcendant Ordnance, or improved cannon for "marine, fort, or field service;" to King George III. "divers "good causes and considerations" him thereunto moving.

[Printed, 2½*d.*]

A.D. 1809, May 4.—N° 3233.

NOON, THOMAS.—"Improvements in guns, pistols, and other "similar fire-arms," &c. which are "applicable to cannon," and large guns. These relate to flint locks. The barrel is made with a swell of a dovetail shape, to which the hammer and pan are attached, and a groove is made to carry off wet, and the pan is thereby to be kept water-tight.

[Printed, 4½*d.* See Repertory of Arts, vol. 15 (*second series*), p. 74; Rolls Chapel Reports, 7th Report, p. 108.]

A.D. 1809, September 28.—N° 3267.

JONES, JOHN.—"Improvements in the manufacturing skelps "for fire-arms." The skelps are formed by dividing a plate of iron, rolled in a suitable wedge-like or taper form, into slices or strips. The plate may be rolled between two rolls, one or both having the diameter reduced at one end, or one of the rolls may have more play given to it at one end, so as to roll the bar in a taper sectional shape.

[Printed, 2½*d.* See Rolls Chapel Reports, 7th Report, p. 205.]

A.D. 1809, December 11.—N° 3286.

MANTON, John.—" Improved lock for guns and pistols."

The Specification and drawings describe a peculiar construction of flint lock, wherein the hammer opens downwards, and the flint acts in a direct line with the pan.

[Printed, 4½*d.* See Repertory of Arts, vol. 16 (*second series*), p. 217; also vol. 31 (*second series*), p. 330; Rolls Chapel Reports, 7th Report, p. 109.]

A.D. 1810, April 11.—N° 3328.

PARR, William.—The invention related to a mode of manufacturing an improved gunpowder.

No Specificaton has been found enrolled.

A.D. 1810, September 7.—N° 3373.

WALKER, James.—" An improved machine or vessel for the " safe conveyance of gunpowder, and for its preservation from " injury by damp." The vessel is made of copper or brass or other suitable material, it is strengthened with hoops, and has a lid which is fastened down on an elastic washer, and is luted or otherwise kept water-tight.

[Printed, 4½*d.* See Repertory of Arts, vol. 29 (*second series*), pp. 6, 311, and 377; Webster's Patent Law, p. 129, case 63; Carpmael's Reports on Patent Cases, vol. 1, p. 356; Parliamentary Report, 1829 (patent law), p. 202; Rolls Chapel Reports, 7th Report, p. 709. This Patent was the subject of litigation between the Patentee and the Government in the person of Sir William Congreve, Comptroller of the Royal Laboratory, " Walker *v.* Congreve." Sir W. Congreve was officially appointed to report on Walker's vessels for holding gunpowder, and he made three reports. In the last, dated August 1811, he reported that they were not suited for the Royal Navy. Evidence was given that he afterwards began to make and supply barrels lined with lead, and ordered some to be made of copper. An ex-parte injunction was obtained from Lord Chancellor Eldon to restrain Sir W. Congreve from making his barrels, but he continued to supply them to Her Majesty's navy, and on July 27, 1816, a motion was made before the Lord Chancellor to commit the Comptroller-General for contempt of Court; an application was made at the same time to dissolve the injunction. The Lord Chancellor Eldon, in giving judgment, said, " I will treat Government here as I would any suitor of the Court. Let " an account be kept of all the machines made in alleged violation of the " Plaintiff's Patent, subject to the profits to which the Plaintiff will be " entitled if the Patent has been infringed." The question of infringement was to be tried at common law, and the injunction was meanwhile dissolved ; but Lord Eldon said, " I would recommend the Government " to pay the costs of the present application, as there are grounds for believing the injunction violated. I can only recommend to Government, " but I would have it understood that if the recommendation is not attended to I will make an order for the Defendant, Sir W. Congreve, to " pay them." The Government appears afterwards to have complied with the Patentee's demands.]

A.D. 1811, March 4.—N° 3400.

TURNER, William.—“ A pike or halbert, with couteaus.”

The pike is in the shape of a trident, and on each side of the centre straight-pointed blade is fixed a curved blade or couteau.

[Printed, 4½*d.* See Rolls Chapel Reports, 7th Report, p. 111.]

A.D. 1811, April 24.—N° 3437.

BRADLEY, John.—“ A new method of manufacturing gun “ skelps.”

A bar of iron is made of the proper weight for a skelp; it is then rolled into the required shape by grooved rollers, which will roll the skelp wider at one end than the other.

The first pair of grooves “ are cut or hollowed out in such a “ manner ” that they produce a bar 4 inches wide at one end, and gradually diminishing to 2½ inches at the other.

The bar is then passed successively through similarly conically-shaped grooves until it becomes a skelp 4⅛ inches wide and ⅜ inch thick at one end, and 3⅛ wide and $\frac{3}{16}$ thick at the other. The edges are made thinner than the middle.

[Printed, 2½*d.* Repertory of Arts, vol. 19 (*second series*), p. 78; Rolls Chapel Reports, 7th Report, p. 111.]

A.D. 1811, June 11.—N° 3456.

PIPER, William.—“ Improved mode of manufacturing gun “ skelps; for making gun barrels.

No Specification was enrolled.

A.D. 1811, July 26.—N° 3469.

JAMES, Henry, and JONES, John.—“ An improvement in “ the manufacture of barrels of all description of fire-arms and “ artillery.”

A skelp of iron of the “ proper form for welding ” is heated in a reverberatory furnace, a maundril is put into it, and the two are placed in a grooved anvil or swage and hammered with a series of hammers with flat or grooved faces placed in a row, and moved by suitable machinery, and the barrel is so formed by welding; or, instead of being welded by hammers, the barrels may be passed through grooved rollers. The barrels are then to be turned in a lathe which is described; the taper form is given by fixing the cutters in a carriage slide, which is made to move on an inclined sliding bar, the incline corresponding to the required taper. Two or more cutters may be used "placed close together, or nearly so, "and following each other," so adjusted as to turn off as much metal as is necessary to give the barrel the required taper shape.

In order to balance the strain of the cutting tools, bearers guides are fixed in suitable frames, and made to move on one or more inclined sliding bars, similar to that on which the cutters move. The bearers are made to move simultaneously with the cutters, and press on the barrel and hold it steady at the parts where the cutting tool or tools are acting. This method is stated to be a great improvement on the method of grinding the barrels previously used.

[Printed, 3½*d.* See Webster's Patent Cases, vol. 1, p. 464; Repertory of Arts, vol. 20 (*second series*), p. 264; Carpmael's Reports on Patent Cases, vol. 1, p. 551; Rolls Chapel Reports, 8th Report, p. 91. This Specification was cited in the case of Russel and Cowley as anticipating Whitehouse's Patent; and Lord Lyndhurst said that the only difference between them was, that Whitehouse dispensed with the mandril.]

A.D. 1811, December 4.—N° 3510.

WINDSOR, FREDERICK ALBERT.—Employing sugar in the manufacture of gunpowder. Sugar dried and reduced to fine powder is to be mixed with the usual ingredients forming gunpowder, in the proportions of 25 parts of sugar to 100 parts of the ingredients.

[Printed, 2½*d.* See Repertory of Arts, vol. 21 (*second series*), p. 261; Rolls Chapel Reports, 8th Report, p. 91.]

A.D. 1812, April 30.—N° 3558.

MANTON, JOSEPH.—"Improvements in guns and pistols."

1st. "A gravitating stop," consisting of a weight attached to a bent lever, is connected with a flint lock. When the barrel is placed in an inclined position, as with the butt resting on the ground or at an angle of about eighty degrees to the horizon, the weight causes the lever to catch the cock and prevent it from striking the hammer, though the trigger be inadvertently pulled.

2nd. "Inverted breeching" is described, having cavities to permit the escape of water; also,

3rdly. A lip is added to the hammer to turn off the wet from the pan

4thly. A curved spring is attached to the trigger-plate, which is struck by a pin attached to the trigger or triggers, and is made to vibrate so as to cause the speaking or click of the lock, when cocked, to produce "a pleasant and musical sound."

[Printed, 6½d. See Repertory of Arts, vol. 22 (*second series*), p. 260; Rolls Chapel Reports, 8th Report, p. 89.]

A.D. 1812, May 11.—N° 3565.

CONGREVE, William.—"An improved system of gun and "carronade carriages." Pieces of ordnance, whether guns or carronades, are to be cast or made with a loop similar to that of a carronade. The carriage consists of two parts, firstly, an outer carriage which has a traversing motion round a fixed center, as a bolt screwed into a port sill, or a swivel bolt working in a plate attached to the sill, and has on one or sometimes two rear transomes.

2ndly. An upper inner carriage or bed that recoils and slides on the outer carriage and has one rear transome working with, or if required, without a roller. It has also attached to its forward part an iron cradle, with ears, which receive the loop of the piece. A strong axle bolt passes through these ears and the loop, and on its ends, which project on each side of the carriage, are keyed two trucks which support the weight of the piece. The trucks are made round or in the form of a polygon, and are turned by levers which act in holes in the end of the axle bolt, so that a great purchase is obtained for running the piece forward while the trucks may be locked when the piece is fired, and so be made to slide during the recoil.

[Printed, 10½d. See Rolls Chapel Reports, 8th Report, p. 89.]

A.D. 1812, July 28.—N° 3588.

SMITH, William.—"An improved gun and pistol lock."

The hammer of a flint lock is made with its striking face to terminate "in a surface gradually rounded," instead of having "an angular edge with a flat face beneath to cover the priming."

[Printed, 5½d.]

A.D. 1812, August 3.—N° 3590.

OSBORN, Henry.—"Improved machine for turning or levelling "various articles [skelps] made of iron preparatory to welding "and grinding."

The Specification and Drawings describe a mode of heading skelps into the required form by heating them throughout in a reverberatory furnace, and then passing them between suitably shaped segments and swages. The swages used become gradually deeper and more angular until the edges of the skelp are made to pproach near enough to be welded.

[Printed, 4½*d*. See Rolls Chapel Reports, 8th Report, p. 92.]

A.D. 1812, September 25.—N° 3599.

EGG, DARS.—" Improvements in the construction of fire-arms " and their locks; and also in the apparatus for trying and " loading them."

Flint locks are described having a spring balance catch to prevent the gun from going off in a vertical or much inclined position. Other improvements in the lock and in the mode of strengthening the stock are described. Guns which easily take to pieces, and the barrel whereof may be used as a walking-stick are described. Also an improved handle or grip for pistols having a hollow for the thumb. Also a powder-flask and shot-pouch having a slide working with a spring to cut off the requisite charge from the contents of the flask or pouch.

Guns are tried by firing them from a stand or rest consisting of a frame having two grooves—in which slide two carriages—one carrying the fore part the other the head part of the gun. At the back is fixed a spring against which the gun recoils so as to test the strength thereof, or a weight may be used instead of a spring.

[Printed, 3½*d*. See Rolls Chapel Reports, 7th Report, p. 113.]

A.D. 1812, November 28.—N° 3617.

OSBORN, HENRY.—" Welding and making of various kinds of " cylinders of iron and steel," as gun-barrels.

The skelps are prepared as described in the Specification of former Letters Patent granted to the patentee (see N° 3590, p. 51). They are welded by a hammer containing grooves of various sizes, gradually decreasing; the face of the hammer strikes upon an anvil, in whose face are cut corresponding grooves. The hammer is actuated by cams or other suitable means. The barrel is hammered between the larger or the smaller grooves as its size in various parts and stages of welding renders necessary. A machine is also described, consisting of a number of segments fixed on a spindle. The segments are grooved, and act as transomes, in connexion with grooved swages.

[Printed, 4½*d*. See Rolls Chapel Reports, 8th Report, p. 97.]

A.D. 1813, July 12.—N° 3722.

PRETYMAN, Robert.—" An improvement in the pan touch-" hole, and pan cover of a gun-lock." In flint locks the pan may be rendered air and water tight, by making the pan cover hollow, and fixing a wad of leather or soft metal on its underside, and cutting channels round the pan to carry off the wet. The touch-hole is also protected from the wet.

[Printed, 4½*d.* See Rolls Chapel Reports, 8th Report, p. 103.]

A.D. 1813, October 15.—N° 3740.

OSBORN, Henry.—" Making tools for tapering cylinders of " different descriptions made of iron, steel, &c," as gun barrels. The Specification and drawings describe a pair of spindles mounted in suitable frames, and carrying grooved collars or rollers which revolve in contact. The grooves are made in a conical or taper form, and of various sizes. When the barrels are passed between them they are rolled to the size and shape required.

[Printed, 4½*d.* See Repertory of Arts, vol. 25 (*second series*), p. 11; Rolls Chapel Reports, 8th Report, p. 98.]

A.D. 1813, November 23.—N° 2755.

BODMER, James.—" A certain method of loading fire-arms, " cannon, and all ordnance, except mortars, at the breech, with a " rifled or plain bore; and also a touch-hole for fire-arms and " ordnance, and a moveable sight," &c. The Specification and drawings describe breech-loading apparatus, wherein a conical piece is used for closing the breech, which may be withdrawn by levers; a wedge-shaped cross piece is used to secure the conical breech piece, and is itself held by side pieces connected with the trunnions. The touch-hole goes through the conical piece; it has a valve which is opened by the priming tube, but is closed by the explosion. The sights, both at the breech and the muzzle, are attached to rings. To these depends a heavy bar, which by the action of its weight in all positions of the piece, maintains the sights always in a vertical position.

[Printed, 5½*d.*]

A.D. 1815, November 23.—No. 3759.

CHERRY, FREDERICK.—Improvements in the construction of an officer's field equipage, and the mode of packing the same. The Specification and drawings describe two boxes, each about 25 inches long by 12 inches wide, and 14 inches deep. To the lids are attached frames, so that one forms a table, the other a chair with a back. A bedstead and frame for supporting hangings may be fixed on the boxes.

[Printed, 6*d.*]

A.D. 1813, December 23.—N° 5773.

SUTTON, RALPH,—" An effectual security to prevent the acci-" dental discharge of fowling pieces," &c.

A moveable "guard hoop of platina or any other metal" is let into the breech pin of flint-lock guns. The hoop is perforated with a hole of the size of or larger than the touch-hole, and when this perforation is opposite the touch-hole the piece can be discharged. In any other position the communication is cut off.

[Printed, 4½*d.* See Rolls Chapel Reports, 8th Report, p. 103.]

A.D. 1814, March 9.—N° 3784.

THOMSON, JAMES.—" Improvements in the construction of " fire-arms and the locks of fire-arms."

The Specification with the aid of thirty-six Drawings describes " a single barrelled and poli-chambered gun;" also self-priming flint locks; also breech-loading guns. The chambers of the " poli-chambered gun " are fixed in a segmental frame, which turns on a horizontal axis at right angles to the axis of the barrel, and are so constructed that they may be consecutively moved by hand, or by apparatus actuated by the cock, so as to be opposite the breech end of the barrel. The outsides of the chambers and of the rear of the barrel are screwed, and when a chamber is opposite the barrel, a clip or collar, screwed in its interior with a quick thread, is made by a half turn to move back on the screwed end of the barrel, and so join it with the chamber.

The lock is made self-priming by forming a chamber or magazine in the hammer, and allowing the priming charge to enter the pan by a kind of tap. By one motion " the lock is cocked, the hammer " shut down, and the priming furnished." The lock is made water-tight by means of elastic washers fixed so as to form tight joints where they are needed.

Breech-loading guns are made with a moveable plug or breech, which is drawn back from the barrel by a quick-threaded screw. The stock is formed in two parts, and the head of the screw is attached to the hinder part; by turning this, the screw is made to withdraw the plug, the charge is inserted, the screw moves back the plug, and by means of a "sliding bolt" is secured from turning, and "the plug is kept firmly in the end of the barrel." Instead of a screw a plain rod may be used to draw back the plug, and when it is pushed up again the plug is fastened in its place by a sliding bolt. Another mode of constructing the breech loader consists in making in the rear end of the barrel an oblong hole or mortice in which works on an axis a stop-piece formed by two sectors moved by a handle. When the piece is ready to be discharged, the two sectors are horizontal, one closes the open end of the barrel, the other is pressed "dead against the breech." By turning the sectors round, the breech end of the barrel is exposed, and the charge may be readily inserted. The breech end of the barrel may be made with an enlarged chamber.

[Printed, 2*s*. 0½*d*. See Rolls Chapel Reports, 8th Report, p. 102.]

A.D. 1814, March 23.—N° 3794.

HEATON, EMANUEL.—"Improvement to the locks and breeches "of fire-arms by rendering the pans of locks and communication "between the priming and loading of fire-arms waterproof." A small groove is formed round the touch-hole and the edge of the pan, where there is a raised rim, and a thread of leather is let into the groove. The seat of the hammer is of the same form as the pan, and has a groove corresponding to its rim, into which a piece of leather is inserted, so that the pan is made water-tight.

[Printed. See Repertory of Arts, vol. 25 (*second series*), p. 131; Rolls Chapel Reports, 8th Report, p. 103.]

AD. 1814, June 7.—N° 3813.

HEYWOOD, GEORGE.—"An improved plan or method of turn-"ing rolls, and of rolling gun and pistol barrels previous to "welding."

The Specification and Drawings describe grooved rollers for forming bars square in section, and taper in form, and afterwards bending up the edges into the shape of a trough preparatory to their being welded.

[Printed. See Repertory of Arts, vol. 26 (*second series*), p. 325; Rolls Chapel Reports, 8th Report, p. 104.]

A.D. 1814, August 4.—N° 3828.

SYKES, Thomas.—“ Improvements in the construction of guns, “ pistols, and other fire-arms, and of implements used for loading “ them.”

“ Improved under and over barrelled double guns and pistols ” are constructed with flint locks, the lock of the under barrel being lower than that of the upper barrel, so that a long train of powder is not required to discharge the lower barrel, and the danger of hanging fire is obviated.

Ramrods are made with perforated top ends or tips to allow the air to pass through them during the process of loading.

Triggers are so constructed that they “ lie down on the trigger “ plate when not in use,” and “ rise up by a side motion when “ wanted, or when the lock or locks is or are at full cock.”

Powder flasks are made with spring stop plates or cutters, so that the charger chamber is cut off from communication with the body of the flask when it is filled with powder. The charger consists of an outer and inner case. The outer slides over the inner one, and by means of steps and catches the chamber of the “ rising charger ” is elongated or shortened, and the charges increased or diminished as may be found necessary.

Shot belts are made with spring stop plates or cutters, which close the communication between the shot in the belt and the shot in the charger when the latter is full.

Pocket powder and shot chargers are also described, in which sliding covers are used without springs.

[Printed, 7½*d*. The patentee brought an action against a person of the same name as himself for stamping on his flasks and belts “ Sykes' Patent.” The action was tried in K. B., Nov. 11, 1824, and the patentee gained a verdict with damages. See Barnewall and Cresswell's Reports, vol. 3, p. 541; Dowling and Ryland's Reports, vol. 5, p. 292; Carpmael's Reports on Patent Cases, vol. 1, p. 433; Rolls Chapel Reports, 8th Report, p. 100.]

A.D. 1814, August 4, N° 3833.

PAULY, Jean Samuel.—“ Improvements in the construction “ and use of fire-arms.” The charge is ignited by means of compressed air. A piston and cylinder, and suitable apparatus and valves for effecting the discharge are let into the stock in the rear of the barrel, in the axis of which is the touch-hole.

A breech-loading piece is also described, in which a hinged lever or lid is attached to the breech, and when it is raised it exposes a chamber for the reception of the cartridge. The air-compressing apparatus may be attached to the lever. The principle may be applied to cannon and revolvers; the moveable breech piece of the cannon works on two extra trunnions fixed near the breech. The breech is fastened by a screw.

[Printed, 6½*d*. See Rolls Chapel Reports, 8th Report, p. 104.]

A.D. 1812, August 17.—N° 3837.

KLEFT, Henry William.—" Constructing a walking staff " containing a pistol," &c. A walking staff is described, consisting of several parts screwed together, containing pistol, ammunition, and writing materials.

[Printed, 2½*d*. See Repertory of Arts, vol. 26 (*second series*), p. 88.]

A.D. 1885, January 4.—N° 3871.

HARRIS, Joseph.—" Improvements in necessaries or clothing " for the military in general." These consist in appending to the knapsack a waterproof cape and collar.

[Printed, 5*d*. See Rolls Chapel Reports, 8th Report, p. 104.]

A.D. 1815, January 20.—N° 3877.

CARPENTER, John.—" A knapsack which prevents the wet " coming between it and the back, and a pouch in front suspended " from the shoulder straps of the said knapsack, so as to counter- " act its weight."

A waterproof cape and collar are attached to the knapsack, which may be rolled up in fine weather.

[Printed, 5*d*. See Rolls Chapel Reports, 8th Report, p. 104.]

A.D. 1815, July 3.—N° 3937.

CONGREVE, Sir William.—" A new mode of manufacturing " gunpowder."

The Specification describes, 1st, mixing apparatus for mixing well together the sulphur, nitre, and charcoal. Each ingredient is put into a separate hopper, beneath the wire bottom of which revolves a cylindrical brush; the brushes cause the particles to fall in streams, which are deposited on an endless apron, which deposits them in a receiving hopper, where they are still further mixed by a revolving brush.

2nd. In the press-house the meal is pressed between guaged plates into cakes about one-eighth inch thick.

3rd. The cakes are broken in an improved granulating mill consisting of two pairs of rollers, the one above breaking the grains coarser than the other below. The meal is passed through the rollers by feeding aprons.

4th. The gunpowder is stowed away in cases or wooden barrels lined with metal, as copper, lead, or pewter; its aperture is closed with waterproof luting, such as beeswax. These cases may be made rectangular.

[Printed, 4½*d.* See note, Patent, No. 3373, p. 28, as to powder cases; Repertory of Arts, vol. 31 (*second series*), p. 65; Rolls Chapel Reports, 8th Report, p. 110.]

A.D. 1815, July 21.—Nº 3942.

MANTON, John.—" An improvement in the construction of " hammers and pans to the locks of all kind of fowling-pieces and " firearms."

The seat of the hammer and the bottom of the pan in flint-locks are made in an angular shape, so that the one fits closely in the other, and the powder is held in a concave surface.

[Printed, 4½*d.* See Rolls Chape Reports, 8th Report, p. 105.]

A.D. 1816, February 29.—Nº 3985.

MANTON, Joseph.—" Certain improvements in the construction " and use of certain of the parts of firearms, and also in the shoeing " of horses."

Instead of discharging the fire-arms with flint-locks a tube is used which contains a detonating substance, which is exploded by percussion. The tubes are to be kept ready prepared, one for every discharge. In shoeing horses the holes for the nails are to be made in the hoof by an instrument like an augur.

[Printed, 7½*d.* See Rolls Chapel Reports, 8th Report, p. 113.]

A.D. 1816, May 14.—Nº 4026.

PAULY, Samuel Jean.—" Improvements in the construction " and use of fire-arms."

These relate to a method of constructing breech-loading fire-arms, and of making a gas-tight joint in breech loaders, and also of discharging fire-arms by condensed air; and are improvements upon those described in the Specification of former Letters Patent (see N° 3833, p. 36), being an improved lock and method of actuating the condensing syringe or piston and cylinder.

Improved breech-loading small arms and cannon are also described. The barrels of small arms have a hinge motion, and in cannon the breech end of the piece has also a hinge motion, and is connected with the trunnions by hooked cheeks; it is held in the rear by a screw; or the breech piece is formed of a part of the barrel which is lifted up on a hinge leaving a recess for the insertion of the cartridge, which is made up with an expanding base or culot.

"The difficulty of producing an air-tight or perfect closure " between the moveable breech and the body or remainder of the " gun" in breech-loading fire-arms is obviated by using a plug " which is so placed in the gun as to come between the charge of " gunpowder and the moveable breeching in all cases, and is " formed of lead, copper, or such other ductile materials as will " give way to the explosive force of the charge," and will so cover and close up the joint.

A collar of leather may be fixed round the ball to lessen windage.

[Printed, 1*s.* 0½*d.* See Rolls Chapel Reports, 8th Report, p. 114.]

A.D. 1816, May 25.—N° 4031.

RICHARDSON, Francis.—" Improvements on the locks and " barrels of fire-arms, and also an improvement or addition to " bayonets."

In flint locks the touch-hole is made large and is covered with a perforated sliding piece actuated by the cock, which allows powder to prime the pan and then partly closes the touchhole, leaving a small aperture.

Also a pin is used instead of a screw to hold the sear spring.

Also a cutting edge is fixed in the head of the bayonet to cut off the ends of cartridges.

[Printed, 4½*d.* See Rolls Chapel Reports, 8th Report, p. 114.]

A.D. 1816, August 12.—N° 4054.

NOCK, Samuel.—" Improvement in the pan of the locks of " guns and fire-arms." Flint locks.

A small tube, shaped like a cannon is placed in the pan having the muzzle end at a distance from the touch-hole. The priming powder is received therein as it escapes from the touch-hole, and is fired by sparks falling between its mouth and the touch-hole.

[Printed, 4½*d.* See Repertory of Arts, vol. 31 (*second series*), p. 119; Rolls Chapel Reports, 7th Report, p. 117.]

A.D. 1817, March 1.—Nº 4105.

OSBORN, Henry.—" A new method or principle of producing " cylinders of various descriptions," such as gun barrels.

A piece of flat iron or steel is bent into the form of a cylinder or a bar is twisted to form the same, and being brought to a welding heat, is placed on a mandril having a shoulder or stop thereon like that of a knight's lance.

It is then passed between grooved rollers having grooves of diminishing sizes, which are taper or conical in shape to give the required shape to the barrel.

To prevent the mandril from passing with the barrel between the rollers a slotted bar is fixed in the front of the rollers, and the barrel passes through the slot, which arrests the shoulder or stop of the mandril.

[Printed, 4½*d.* See Mechanics' Magazine, vol. 33, p. 386. Carpmael's Reports on Patent Cases, vol. 1, p. 578; Rolls Chapel Reports, 8th Report, p. 120.]

A.D. 1817, March 11.—Nº 4107.

SARTORIS, Urbanus.—" Improvements in the construction and " use of fire-arms."

The Specification and drawings describe breech-loading fire-arms. The breech-piece turns upon two side pins. The barrel is connected to the stock by divided rings or bands in which it slides; it is connected with the hinged breech-piece by male and female screws having parts of their circumferences respectively cut away to the bottom of the thread, so that the one will slide home within the other, and then engage with a small turn. The barrel is turned to unscrew it, and then pushed back by a handle; the breech-piece is then raised for the insertion of the cartridge, and is again pushed down and connected with the barrel by the screw as described.

[Printed, 6½*d.* See Rolls Chapel Reports, 7th Report, p. 117.]

A.D. 1817, September 26.—N° 4166.

MANTON, Joseph.—" Improvements in locks for fire-arms."

Flint locks are made with pans having the bottom wider than the top, so that the sides incline inwards, and so hold the powder.

[Printed, 4½*d*. See Rolls Chapel Reports, 7th Report, p. 108.]

A.D. 1818, February 3.—N° 4218.

WYATT, Matthew Cotes.—" The safeguard to prevent the " accidental movement of the cock of a gun or pistol or other fire- " arm forward towards the hammer." A bolt or catch is used, acting internally or externally against the tumbler, to prevent the forward motion of the cock, except when the trigger is pulled.

[Printed, 4½*d*. See Rolls Chapel Reports, 8th Report, p. 125.]

A.D. 1818, July 22.—N° 4281.

SARTORIS, Urbanus.—The Letters Patent relate to a method of producing ignition in fire-arms by the condensation of atmospheric air.

No Specification was enrolled.

A.D. 1818, August 3.—N° 4285.

MANTON, Joseph.—" Primers for fire-arms," and improvements in cocks, &c. The primer consists of a tube of thin metal or other suitable material, filled with detonating powder. The tube is placed in a grooved pan at right angles to the touch-hole, which is in the side of the barrel. It is held there by a weak spring or forked lever until struck and exploded by the cock or hammer.

[Printed, 5½*d*. See Repertory of Arts, vol. 34 (*second series*), p. 338; Rolls Chapel Reports, 7th Report, p. 120.]

A.D. 1818, November 24.—N° 4315.

COLLIER, Elisha Haydon.—" Improvement in fire-arms of " various descriptions; which improvement is also applicable to " cannon."

The Specification and drawings describe a flint-lock revolver, with a single barrel; the chambers are made of separate cylinders, fastened together, or are bored out of a solid cylinder, forming a revolving breech-piece. The chamber cylinder revolves on a pin, and is moved round by a spiral spring like that of a watch, which requires to be wound up from time to time; it acts by means of a toothed wheel and a catch actuated by the lock motions. Each chamber is recessed at its mouth, and is pushed on to a shoulder on the rear of the barrel by a spring, which pushes forward the breech-piece; a bolt is at the same time pushed forward from behind, and with a catch holds the chamber and prevents recoil. After the piece is fired, the catch is released, the bolt is drawn back, and the breech-piece moves back and is allowed to be turned round by apparatus actuated by the spiral spring and the lock motion. Provision is made in the hammer for priming the piece at every discharge.

[Printed, 10½*d*. See Rolls Chapel Reports, 8th Report, p. 130.]

A.D. 1819, January 23.—N° 4336.

SARTORIS, Urbanus.—" Improvements in the construction " and use of fire-arms." A chamber is constructed for containing the priming for flint locks; apparatus is attached which prevents the gun from going off while being charged, and makes the piece self-priming.

An improvement upon the construction of breech-loading guns, described in the Specification of Letters Patent of the 11th of March, A.D. 1817 (see N° 4107, p. 60), consists in dispensing with rings for fastening the barrel, and using studs with heads, which enter holes and slide in grooves in the "main bottom plate" of the stock.

[Printed, 6¼*d*. See Rolls Chapel Reports, 8th Report, p. 130.]

A.D. 1820, January 15.—N° 4427.

FOX, Francis.—" Improved method of facilitating and insuring " the discharge of fire-arms and artillery of every description."

Detonating powder is used for discharging the piece; it is placed in the cavity of a "priming tube," which is fixed in the barrel standing out from its side, and communicating with its touch-hole. The priming tube is cylindrical, and when the detonating powder is put in its cavity it is covered with a cylindrical varnished paper, or other suitable case, which is slipped on the tube, and keeps the priming water-tight. When the piece is fired the head of the cock is made to strike into the pan of the priming tube, breaking the paper and discharging the piece.

[Printed, 5½*d*. See Repertory of Arts, vol. 36 (*second series*), p. 277; London Journal (*Newton's*), vol. 1, p. 101; Rolls Chapel Reports, 7th Report, p. 122.]

A.D. 1820, April 11.—N° 4444.

HALL, William, and ROSTILL, William.—"Improvements "in the manufacture of halfts, handles, or hilts for knives, forks, "swords," &c.

These relate to modes of making handles, sword-hilts, &c. of turtle or tortoise shell, or other suitable materials.

No specification was enrolled.

A.D. 1820, July 20.—N° 4491.

DELL, William.—"An improvement in gun-barrels." The bore of a gun-barrel is so arranged that the charge is contained in "safety chamber," having a bore less in diameter than the other part of the barrel. The safety chamber consists of a hollow cylinder of iron, steel, or other suitable metal, which is introduced at the breech end, and fills in the bore of the barrel; it is cup-shaped at the end nearest the muzzle, and is soldered to the barrel, and the breech screwed tightly up to it. The barrel may, if preferred, be bored with a narrow chamber at the breech.

[Printed, 4½d. See London Journal (*Newton's*), vol. 1, p. 328.]

A.D. 1821, July 30.—N° 4577.

MANTON, John.—"An improvement in the construction of "locks of all kinds of fowling-pieces and fire-arms." The sear of a flint lock is so made "as to have the back end placed crosswise "in the plate, instead of lengthwise."

This arrangement "admits of the trigger blade being so formed "as to require only a small notch in the trigger plate, instead of a "long one," which lets in much wet.

[Printed, 4½d. See London Journal (*Newton's*), vol. 3, p. 71.]

A.D. 1821, September 14.—N° 4590.

WEBSTER, William.—Improvements in mechanism for discharging fire-arms. These relate to improvements on the method of discharging by detonating powder, described in the Specification of Letters Patent granted to Alexander John Forsyth, dated April 11, 1807. (See No. 3032, p. 44.)

The detonating powder is placed in a magazine which, turning round the plug or nipple, deposits in it a detonating charge.

Or, a small chamber is made in the cock, which is filled with a detonating charge from a magazine placed above it every time the cock is raised. It is then discharged by the cock falling on a perforated nipple.

[Printed, 5½*d.* See London Journal (*Newton's*), vol. 3, p. 72.]

A.D. 1821, November 10.—N° 4611.

RICHARDS, William Westley.—"An improvement in the "construction of gun and pistol locks."

Locks on the detonating principle are made with a magazine, containing the detonating priming attached to the lock by a hinge. It deposits the priming in the pan, and as the cock descends it pushes a bar, which throws back the priming magazine, leaving the pan containing the priming exposed to the cock, which strikes the priming and fires the charge.

[Printed, 4½*d.* See London Journal (*Newton's*), vol. 3, p. 225.]

A.D. 1822, February 12.—N° 4648.

DAVID, Samson.—"An improvement upon the lock for guns "and other fire-arms."

The lock is a compound one, and may be used as a flint lock, or be made to act on the detonating principle. The nipple is made to turn on a hollow axis, communicating with the touch-hole. The charge may be fired by detonating priming placed on the nipple, or by turning it round on the axis an open pan is exposed, and the flint may be struck against a hammer in the usual way.

[Printed, 4½*d.* See Repertory of Arts, vol. 43 (*second series*), p. 68; London Journal (*Newton's*), vol. 6, p. 18.]

A.D. 1822, March 2.—N° 4652.

BUCKLE, John William.—"Machinery for shaping or cutting "out irregular forms in wood," &c. The Specification and drawings, which should be referred to, describe machinery, which may be used for cutting gun-stocks, lasts, &c. The wood is cut by circular cutters revolving at great speed; the depth and form of cut is regulated by means of friction rollers connected with a moveable frame carrying the cutters. The rollers press upon a pattern or form of the exact shape required to be cut from the block of wood. As the pattern slowly revolves the irregularities of its surface cause the friction rollers to yield and so move the frame carrying the cutters; the block of wood revolves with the pattern, and the distance of the friction rollers from the axis of rotation of the pattern regulates the distance of the cutting edge of the cutters from the axis of rotation of the block, so that the cutters cut from the block a counterpart of the pattern.

[Printed, 1*s.* 5*d.* See London Journal (*Newton's*), vol. 5, p. 238.]

A.D. 1822, September 27.—N° 4705.

BOOTHBY, BENJAMIN.—"An improved method of manu- "facturing cannon shot," &c.

Cannon shot are to be cast in sand moulds instead of metal moulds.

[Printed, 2½*d.* See London Journal (*Newton's*), vol. 5, p. 189; Register of Arts and Sciences, vol. 2 (*new series*), p. 37; Engineers' and Mechanics' Encyclopædia, vol. 2, p. 660.]

A.D. 1822, November 9.—No. 4724.

DEAKIN, FRANCIS.—"Improvement in the manufacture of "holster cases," &c.

Holster cases and cartouche boxes are made of rolled iron, or other sheet metal, or by preference of tin plate. The metal is covered with leather, skin, or other suitable material, by using varnish, glue, or other adhesive substances.

[Printed, 2½*d.* See London Journal (*Newton's*), vol. 8, p. 68.]

A.D. 1822, November 26.—N° 4727.

EGG, JOSEPH.—"Improvements in the construction of guns and "fire-arms, upon the self-priming or detonating principle."

The priming detonating powder is contained in a magazine placed on the top of the barrel. By means of suitable passages and a stop plate the priming powder is conducted to the pan of the touch-hole; the communication between it and the magazine is then cut off, and the head of the cock discharges the piece by striking the priming in the pan of the touch-hole.

[Printed, 5½*d.* See London Journal (*Newton's*), vol. 5, p. 119.]

A.D. 1823, January 16.—N° 4750.

MILLER, GEORGE.—The Letters Patent related to a plan for communicating the spiral motion to shot and shells when fired from plain barrels, and for igniting by percussion, the shells to which spiral motion has been thus communicated.

No specification was enrolled.

A.D. 1823, July 29.—N° 4823.

JACKSON, John.—" Improvements in the construction of the " locks used for the discharge of guns and other fire-arms on the " detonating principle."

A magazine for containing the detonating priming powder is attached to the cock. A portion of the powder is introduced into a recess in the cock, and the communication with the magazine is then cut off. As the cock descends, a nipple connected with the touch-hole enters into the primed recess of the cock, and discharges the piece.

[Printed, 5½*d*. See London Journal (*Newton's*), vol. 7, p 72.]

A.D. 1823, October 16.—N° 4853.

CONGREVE, Sir William.—" Improvements in fireworks." War rockets.

Rockets are so constructed that on bursting a parachute is liberated, to which a signal-light or firework may be attached.

War rockets and others are made with short sticks, to which vanes are attached, revolving on loose rings or collars on the sticks, or the vanes may be attached to the rocket cases. The time of the bursting of the rocket is regulated by a time-fuse.

Fire-arms, rockets, and other fireworks and cannon may be fired by self-igniting crackers made of fulminating silver and powdered glass, surrounded with suitable combustible substances.

[Printed, 3½*d*. See London Journal (*Newton's*), vol. 8, p. 63.]

A.D. 1823, November 13.—N° 4861.

DAY, John.—" Improvements on percussion gun-locks," &c.

The lock and hammer are placed and act underneath the stock. The mainspring is connected by a swivel directly with the cock, which acts as a lever of the third order. The touch-hole is made through the breech, connected with " a nipple or spill " made to " receive copper percussion caps, and convey the fire into the " breech."

Walking-stick guns constructed on these principles are described.

[Printed, 5½*d*. See London Journal (*Newton's*), vol. 7, p. 290.]

A.D. 1824, March 20.—N° 4923.

PETIT, PIERRE JEAN HENRY.—" An engine or machine" for making scabbarbs, cartouche boxes, shoes, &c., from leather without seams. The Specification and drawings describe apparatus for putting leather into the necessary shapes, and pressing them when soaked upon mandrils or moulds or otherwise, into the forms required.

[Printed, 6½*d*. See Repertory of Arts, vol. 1 (*third series*), p. 64; London Journal (*Newton's*), vol. 9, p. 344; Rolls Chapel Reports, 7th Report, p. 124.]

A.D. 1824, May 15.—N° 4952.

PERKINS, JACOB.—" An improved mode of throwing shells and " other projectiles," as rockets. The shell, which is made of iron, may be cylindrical in shape like a rocket, and be provided with a stick or tail. It is filled with water, closed at the rear end with a fusible metal plug. It is then to be heated, and when the plug melts the steam escapes, and impinging on the air drives forward the projectile.

[Printed, 6½*d*. See London Journal (*Newton's*), vol. 9, p. 418; Mechanics' Magazine, vol. 4, p. 417; Register of Arts and Sciences, vol. 2, pp. 105 and 369.]

A.D. 1824, May 30.—N° 4960.

COOK, JAMES.—" Making and constructing locks for guns, " pistols," &c.

Locks are made with a mainspring coiled round the striker. The drawings show a walking-stick gun. The barrel is fitted to a hollow stock or handle, and the nipple and touch-hole are in the breech in a line with the axis of the barrel. A copper percussion-cap is placed on the nipple, and is struck by a flat striker actuated by a spiral spring contained in a tubular chamber in the stock or handle; the spring is drawn back by hand, and is held by a catch and released by a trigger motion.

[Printed, 4½*d*. See London Journal (*Newton's*), vol. 9, p. 297.]

A.D. 1824, July 27.—N° 4990.

BERENGER, CHARLES RANDOM DE.—Improvements in percussion locks. The Specification and drawings describe a complicated percussion lock, wherein the priming is contained in a magazine, and when deposited in the touch-hole is discharged by a punch connected directly with the mainspring.

The percussion priming may be made up in " powder pellets, " patches, metallic caps," or other forms.

[Printed, 6½*d*. See London Journal (*Newton's*), vol. 10, p. 129.]

A.D. 1824, November 4.—N° 5026.

SOMERVILLE, John.—" Method applicable to fowling-pieces " or other fire-arms," &c. to prevent accidental discharge thereof.

The principle of the invention consists in so constructing the lock that it will require the use of the left hand as well as of the right to discharge it. This may be done in various ways, as by having a lever or catch, or slide or stop, which prevents the trigger from being drawn by the right hand until the catch be released by the left hand.

[Printed, 10½*d.* See London Journal (*Newton's*), vol. 11, p. 12; Mechanics' Magazine, vol. 5, p. 86; Register of Arts and Sciences, vol. 3, p. 283.]

A.D. 1824, November 6.—N° 5033.

CARTMELL, Thomas.—" An improved cock," &c., firing by percussion and self-priming. The cock is made hollow, and contains a self-acting water-tight magazine for holding small detonating balls. These are released, one by one, by the motion of cocking, are exposed when the trigger is drawn, and are struck upon the nipple and so exploded.

[Printed, 7½*d.* See Repertory of Arts, vol. 1 (*third series*), p. 349; London Journal (*Newton's*), vol. 11, p. 126; Mechanics' Magazine, vol. 5, p. 63.]

A.D. 1824, December 18.—N° 5055.

DAVIS, Samson.—" Improvements applicable to guns and other " fire-arms." The guns are made with a hinge on the upper side connecting the barrel and stock; when together they are fastened by a bolt underneath. The nipple is placed in the breech, and the stock is recessed to admit the nipple (which is thereby protected), and enable the lock to actuate a horizontal striker working in the rear of the barrel. The barrel is turned back from the stock by means of the hinge, to allow of the percussion cap being placed on the nipple; the lock and barrel are then brought together again and bolted, and the piece is discharged.

[Printed, 4½*d.* See London Journal (*Newton's*), vol. 12, p. 251.]

A.D. 1825, February 19.—N° 5099.

MOULD, Jacob.—" Improvements in fire-arms." Barrels are made with a number of touch-holes placed at certain distances from *each other,* so that several charges may be placed in the barrel one before the other and be discharged successively each from its own touch-hole. The cock and hammer in the case of a flint lock are made to slide along the barrel, so as to discharge at any required touch-hole.

[Printed, 5½d. See London Journal (*Newton's*), vol. 12, p. 145.]

A.D. 1825, February 26.—N° 5106.

MANTON, Joseph.—" Improvements in fire-arms." Percussion pellets. Globular pellets of detonating powder are used. They are contained in a self-acting magazine attached to the lock, called " a revolving pellet carrier."

[Printed, 5½d. See London Journal (*Newton's*), vol. 12, p. 169.]

A.D. 1825, March 25.—N° 5135.

MANTON, Joseph.—" A certain improvement in shot." This consists in coating small shot with mercury.

[Printed, 2½d. See London Journal (*Newton's*), vol. 12, p. 361; Repertory of Arts, vol. 1 (*third series*), p. 387; Register of Arts and Sciences, vol. 3, p. 179.]

A.D. 1825, April 23.—N° 5155.

HANOUT, Augustin Louis.—" Improvements in artillery musketry and other fire-arms." (A communication.) These relate to modes of loading at the breech. The charge is placed in a short charging tube or barrel, which is inserted in the rear end of the shooting barrel, their bores being made of the requisite size to enable the one to fit accurately in the other, and the touch-holes in both being made to correspond. The barrel in the case of small arms is made to turn on centres in the forepart of the stock, and the rear end of the charging tube is pressed against an abutment piece let into the stock, when the shooting barrel is fastened down in the stock. In ordnance the breech-piece is removed to admit the charging tube, and when replaced is fastened by a wedge or cotter. Several charges may be inserted in the charging tube, and be fired successively from separate touch-holes by separate locks.

[Printed, 8½d. See London Journal (*Newton's*), vol. 13, p. 73.]

A.D. 1825, May 20.—N° 5175.

RIVIERE, Isaac.—" Machinery by which guns, pistols, and other " fire-arms are discharged." Lock. The Specification and drawings describe a lock of simple construction. The main spring is screwed to the under side of the false breech, the cock and tumbler are in one piece, and are directly acted upon by the mainspring in an upward direction by means of a swivel; they are held and released by the sear and trigger in the usual way.

[Printed, 5½*d*. See London Journal (*Newton's*), vol. 11, p. 10.]

A.D. 1825, August 15.—N° 5242.

DOWNING, Charles.—" Improvements in fowling-pieces and " other fire-arms." Modes of discharge. Balls or pellets of detonating powder are contained in and fed from a magazine by self-acting motions. The mainspring is made to act as a trigger guard. The lock may be fastened by a screw turned by a key specially made to fit, so as to prevent any one but the owner from firing the piece.

[Printed, 6½*d*. See London Journal (*Newton's*), vol. 13, p. 135.)

A.D. 1825, December 3.—N° 5305.

BEEVER, John.—" An improved gun-barrel." The barrel is made of " an oval, elliptical, or other similar form, in order to give " a more effective range to the charge of shot." The barrel is heated, and put " upon a mandril of the required form," and by preference " an oval prism having the conjugate equal to two-thirds " of the transverse diameter." The barrel is beaten upon the mandril into the required form.

[Printed, 3*d*. See London Journal (*Newton's*), vol. 13, p. 142.]

A.D. 1826, January 16.—N° 5317.

NEWMARCH, Benjamin.—" An improved method of exploding " fire-arms." Ignition is proposed to be effected by means of compressed air. A piston and cylinder are contained in the stock. The piston is actuated by a spring released by the trigger, the fire is communicated to the charge through the touch-hole in the rear of the breech by the action of a ball valve.

[Printed, 4½*d*. See Repertory of Arts, vol. 3 (*third series*), p. 424; London Journal (*Newton's*), vol. 12, p. 72.]

A.D. 1826, June 26.—N° 5379.

HALAHAN, Thomas.—" Machinery or apparatus for working " ordnance." The gun is fixed on a carriage, and moves backwards and forwards on a grooved platform. At the fore part of the platform is fixed a cylinder, which contains a very strong spring; the outside of the cylinder acts as a drum, round which is coiled a rope or chain attached to a cross-bar underneath the gun-carriage, which also serves to keep the gun from rising. As the gun recoils backwards, the rope or chain turns the drum and winds up the spring contained therein; the gun is held at the place to which it recoils by means of a rack bar and suitable catch or stop; it is then re-loaded, and may be run up to be fired by the action of the spring.

[Printed, 5½*d.* See Repertory of Arts, vol. 4 (*third series*), p. 313; London Journal (*Newton's*), vol. 14, p. 92.]

A.D. 1826, August 12.—N° 5402.

HAZARD, Erskine.—" Methods of preparing explosive mix-" tures," &c. Explosive vapours are mechanically mixed with atmospheric air by the apparatus described, and are exploded in a cylinder provided with a piston, so that a motive power is thereby obtained for moving machinery.

[Printed, 6½*d.* See London Journal (*Newton's*), vol. 13, p. 1.]

A.D. 1826, October 18.—N° 5416.

MILLS, William.—" An improvement in fire-arms." This consists in attaching to the stock of the gun a rest or supporter, which will stand out from the stock and receive the arm in a suitably-shaped hollow. The gun may be thereby pressed laterally with the inside of the arm while it is held firmly against the shoulder.

[Printed, 5½*d.* See Repertory of Arts, vol. 5 (*third series*), p. 371; London Journal (*Newton's*), vol. 2 (*second series*), p. 20; Mechanics' Magazine, vol. 10, p. 191.]

A.D. 1826, November 27.—N° 5421.

NEWMARCH, Benjamin.—" Improvements on fire-arms." Modes of effecting discharge by percussion. Hinged locks. In small arms the detonating powder is contained in a conical chamber, the lid of which is hinged, and rises to allow the smoke of the discharge to escape. The blow is given by a bar or punch acting in a line with the axis of the bore of the barrel, in the rear end of which is the touch-hole. To preserve the touch-hole a false breech is introduced behind it, consisting of a screw, perforated so that its hole corresponds with the touch-hole; the screw may be withdrawn and replaced when requisite.

Percussion locks to discharge ordinary caps may be attached to ordnance by a hinge, so that the lock cannot be blown off, but will rise and yield to the force of any explosion. The touch-hole may be in the breech, in a line with the axis of the piece.

[Printed, 6½*d*. See Repertory of Arts, vol. 5 (*third series*), p. 422; London Journal (*Newton's*), vol. 14, p. 76; Engineers and Mechanics' Encyclopædia, vol. 1, p. 30.]

1826, December 20.—N° 5439.

BERENGER, CHARLES RANDOM DE.—" Improvements in gun-" powder flasks," &c. The charger is attached to an arm projecting from the thumb-knob, and a funnel is attached to the side for loading without turning over the flask.

A safety plug or valve is used which cuts off communication between the charge and the powder in the flask.

[Printed, 5½*d*. See Repertory of Arts, vol. 5 (*third series*), p. 170; London Journal (*Newton's*), vol. 2 (*second series*), p. 29.]

A.D. 1827, June 26,—N° 5511.

MARSHALL, JAMES.—" Improvements in mounting guns or " cannon for sea or other service."

The gun is to be supported on two separate carriages, the muzzle or fore part rests on a frame turning on a fixed centre pin, and supported on wheels at its periphery so as to give a transversing motion. The trunnions and rear end of the gear are supported on a carriage running on wheels, which are so placed as to be nearly under the cascable. When the gun recoils it is made to act on a rope and run itself up.

[Printed, 5½*d*. See Repertory of Arts, vol. 7 (*third series*), p. 186; London Journal (*Newton's*), vol. 4 (*second series*), p. 70.]

A.D. 1827, October 11.—N° 5553.

HORTON, JOSHUA.—" Making of hollow cylinders, guns, " ordnance," &c. " in wrought iron, in steel, or composed of " both these metals."

Bars of iron or steel, or either or both, are made of suitable shape, being taper or radiating latitudinally, or of such a sectional shape as to lie close or to interlock, when hooped together to form a cylinder or barrel of a gun. In this position the bars are heated and welded together on a mandril, so as to form a wrought iron or steel barrel, which is subsequently turned and bored.

The trunnions may be welded on to the barrel in one piece, or be attached by means of a hoop, which is fixed securely on the barrel by keys, wedges, or screws, "or by any other secure and "consistent mode by which it can be attached to or removed "from the gun." A detached wrought-iron breech-piece may be used, which is firmly screwed into the gun, and may be unscrewed if required, or the breech may be made solid.

[Printed, 6½*d.* See Repertory of Arts, vol. 7 (*third series*), p. 425; London Journal (*Newton's*), vol. 6 (*second series*), p. 334; Register of Arts and Sciences, vol. 3 (*new series*), p. 3; Engineers and Mechanics' Encyclopædia, vol. 1, p. 311.]

A.D. 1827, November 28.—N° 5570.

JENOUR, Joshua.—"A cartridge or case," &c.

The cartridge is made of wire, woven with meshes so wide as to allow the shot to be scattered.

[Printed, 4½*d.* See Repertory of Arts, vol. 8 (*third series*), p. 15; London Journal (*Newton's*), vol. 1 (*second series*), p. 293; Register of Arts and Sciences, vol. 3 (*new series*), p. 102.

A.D. 1828, September 18.—N° 5708.

ORSON, Edward Forbes.—"An improved cartridge" for small shot.

The cartridge is made in two parts, so that the powder may be easily separated from the shot. The shot-case is made to break on issuing from the barrel, and so scatter the shot.

[Printed, 4½*d.* See London Journal (*Newton's*), vol. 4 (*second series*), p. 187; Register of Arts and Science, vol. 3 (*new series*), pp. 286, 544.]

A.D. 1828, December 8.—N° 5726.

DICKSON, Isaac.—"An improved projectile" is the title of the invention, but the Specification describes a walking-stick gun, having a telescopic movement, which enables the lock and breech of the gun, which are tubular in shape, to slide into the tubular handle of the stick, which forms the stock. When the barrel and breech part are drawn out, the handle may be bent by a hinge into a shape suitable for firing the piece from the shoulder.

[Printed, 5½*d.* See Repertory of Arts, vol. 9 (*third series*), p. 89; London Journal (*Newton's*), vol. 3 (*second series*), p. 138.]

A,D. 1828, December 15.—N° 5738.

WHITEHEAD, John Dicken.—The Letters Patent relate to improvements in making, constructing, or manufacturing cartridges for sporting and other purposes.

No specification was enrolled.

A.D. 1829, September 2.—N° 5838.

MANTON, George Henry.—"An improvement in the con-" struction of locks in all kinds of fowling-pieces and fire-arms." Lessening recoil.

"The lessening of the recoil occasioned by the rapid inflamma-" tion of the gunpowder" is to be effected "by giving a greater" vent of the gaseous matters generated in the explosion." An aperture or vent-hole is made near the base of the nipple, which is closed by a plate or cap attached to a bent lever actuated by the cock. When the piece is fired, the cap is removed from the vent-hole, and the gases escape therefrom.

[Printed, 5½d. See London Journal (*Newton's*), vol. 9 (*second series*), p. 133; Register of Arts and Sciences, vol. 4 (*new series*), p. 133.]

A.D. 1829, September 9.—N° 5839.

TUCKER, John.—"Improvements in the construction of cannon." Breech-loading cannon. The bore is made through the cannon and in the breech end is inserted a conical plug which is pierced with a hole corresponding with the bore. The plug acts like that of an ordinary tap, and opens the barrel of the piece to admit the charge and then, by being turned half round, closes it.

[Printed, 4½d. See London Journal (*Newton's*), vol. 5 (*second series*), p. 72; Register of Arts and Sciences, vol. 4 (*new series*), p. 232; Rolls Chapel Reports, 7th Report, p. 130.]

A.D. 1829, September 15.—N° 5845.

LAWRENCE, David, and CRUNDWELL, John.—"Improve-" ments in apparatus to be applied to fowling-pieces and other fire-" arms in the place of locks." The nipple is attached to a moveable plate let into the side of the fire-arm and turning on a hinge at one end. The lock is cocked by opening this plate to place a cap upon the nipple attached thereto. No external cock is required, and the piece is discharged by a trigger in the usual way.

[Printed, 5½d. See London Journal (*Newton's*), vol. 9 (*second series*), p. 206; Register of Arts and Sciences, vol. 4 (*new series*), p. 260.]

A.D. 1829, November 2.—N° 5864.

TUCKER, John.—An exploding shot or projectile percussion shell.

The shell contains a hollow tube in which slides a loose bar or striker. At one end of the tube is the fulminating powder communicating with the bursting charge. When the shell is fired the striker is at the end of the tube not primed, when it strikes against an object the momentum causes the striker to impinge upon the fulminating powder, and causes it to explode.

[Printed, 5½*d.* See London Journal (*Newton's*), vol. 5 (*second series*), p. 146; Register of Arts and Sciences, vol. 5 (*new series*), p. 4; Rolls Chapel Reports, 7th Report, p. 131.]

A.D. 1830, February 27.—N° 5905.

BERENGER, Charles Random, Baron de.—"Improvements "in fire-arms and other weapons of defence."

The Specification and drawings, which are numerous, describe,—

1st. A lock to which is attached a moveable piece called a protector, which, by interposing itself between the cock and nipple, or by engaging the trigger, prevents accidental discharge.

2nd. A lock provided with a self-acting magazine to contain a detonating percussion powder or pellets.

3rd. Bayonets which are fastened on the barrel by being locked by the ramrod.

4th. Swords which have a moveable sliding weight attached to their backs which may be moved nearer to or farther from the point to give more or less effect to the blow according to the fancy of the swordsman.

[Printed, 9½*d.* See London Journal (*Newton's*), vol. 5 (*conjoined series*), p. 222; Register of Arts and Sciences, vol. 5 (*new series*), p. 130.]

A.D. 1830, August 7.—N° 5978.

SMITH, Samuel.—"A new nipple or touch-hole" for percussion fire-arms, and "a new cap or primer."

The nipple is made very large in diameter, and has a raised part in its centre near the touch-hole; it may be made of steel or other hard metal, and be screwed into the breech.

The cap, that it may be easily handled, is made large to correspond with the nipple, and the priming is placed in a small cup in the centre thereof, so as to be opposite the raised part of the nipple when placed thereon.

[Printed, 4½*d.* See London Journal (*Newton's*), vol. 3 (*conjoined series*), p. 192; Register of Arts and Sciences, vol. 5 (*new series*), p. 170; Rolls Chapel Reports, 7th Report, p. 132.]

A.D. 1830, December 6.—N° 6046.

LACY, George John, and DAVIS, Sampson.—" Improvements " in the construction of guns and fire-arms."

These consist:—1st. In fixing the mainspring outside the lock and making a head fixed upon it act as a striker. The spring when cocked is held by a lever catch, and when released it strikes the nipple with a cavity formed in its head.

2nd. The mainspring may be connected directly with a cock by a swivel, so that the cock acts as a lever of the third order.

[Printed, 5½*d*. See Repertory of Arts, vol. 12 (*third series*), p. 133; London Journal (*Newton's*), vol. 8 (*second series*), p. 83; Register of Arts and Sciences, vol. 6 (*new series*), p. 104.

A.D. 1830, December 17.—N° 6053.

REDFERN, Bartholomew.—" A lock, break-off and trig- " ger," &c.

The lock is discharged by means of a small punch situated in the upper part of the break-off, the punch passes down through the break off, and when pressed, disengages the sear from the bent of the tumbler. The action of the trigger when pulled with the finger uncovers the head of the punch. In the drawings the parts that are new and are claimed are distinguished by small letters from the parts that are old, which are marked by capital letters.

[Printed, 6½*d*. See London Journal (*Newton's*), vol. 6 (*conjoined series*), p. 156; Mechanics' Magazine, vol. 15, p. 206; Register of Arts and Sciences, vol. 6 (*new series*), p. 5.]

A.D. 1831, February 11.—N° 6071.

RICHARDS, Westley William.—" Improvements in the " touch-holes and primers suitable to percussion guns and pistols," &c.

The touch-holes are protected by a shield instead of the usual nipple and the primers are made T-shaped. The shield consists of a short cylindrical tube of a considerable diameter; in the side of the tube is an aperture to allow the smoke and flash of the percussion primer to escape.

[Printed, 5½*d*. See London Journal (*Newton's*), vol. 7 (*second series*), p. 135; Register of Arts and Sciences, vol. 6 (*new series*), p. 47; Rolls Chapel Report, 7th Report, p. 134.]

A.D. 1831, July 13.—N° 6137.

DEMONDION AUGUSTUS.—"Improvements on guns, muskets, and other fire-arms and in cartridges to be used therewith, and method of priming the same, and in the machinery for making the said guns, muskets, and fire-arms, also the cartridges and priming," &c.

The Specification and drawings describe, firstly, breech-loading fire-arms; the breech-piece has a concave face and is moved round the convex end of the barrel on axes attached thereto by a lever that shuts down on the stock in a suitable grove. The breech piece may be made of iron, with a cylinder of gun metal let into it in a line with the axes of the barrel. The ends of the breech and of the lever bear against suitable metal abutments attached to the stock. The motion of the lever downwards cocks the lock by means of a pin with a roller at its end; this projects underneath the breech-piece, and forces down the mainspring, which is then caught by a tumbler connected with the trigger.

Cartridges having a tube containing detonating powder, projecting from the base, are inserted in the breech end of the barrel, and exploded by a hammer attached to the end of the mainspring and striking upwards.

A mode of fixing bayonets by means of a spring and catch is described.

Machinery for grinding the ends of the barrel and breech-piece, and for shaping other parts thereof, and for making the detonating tubes, is also described.

[Printed 1*s*. 6½*d*. See London Journal (*Newton's*), vol. 10 (*conjoined series*), p. 209; Mechanics' Magazine, vol. 31, p. 200; Register of Arts and Sciences, vol. 7 (*new series*), p. 67.]

A.D. 1831, July 15.—No 6139.

CLANRICARDE, JOHN DE BURGH, Marquis of.—"Improveprovements in fire-arms, and in the projectiles to be used therewith."

A breech-loading fire-arm is described having a "sliding breech moving between two side plates, which side plates connect it with the barrel by means of screws and trunnions formed on the barrel." The sliding breech is moved back by hand, and is raised to admit the cartridge in front, it is then lowered and pushed up to the barrel, and a wedge (working on a hinge and raised by a lever) is forced down behind it.

The cartridge consists of many sections of a cylinder united so as to form a cylinder. These are intended to be scattered when fired, and the barrel is made of a flat bell-mouthed shape for this object.

[Printed, 6½*d.* See London Journal (*Newton's*), vol. 10 (*conjoined series*), p. 73; Register of Arts and Sciences, vol. 7 (*new series*), p. 65.]

A.D. 1831, September 6.—No 6159.

BICKFORD, William.—Igniting gunpowder for blasting, "the miner's safety fuze."

"Gunpowder or other proper combustible matter prepared in the "usual pyrotechnical manner of firework, for the discharging of "ordnance," is introduced into twisted rope or cord, the strands of which are worked round it; the gunpowder thus forms a core or thin cylinder in the rope, and makes a fuze of any required length. The rope is afterwards varnished on its exterior surface or otherwise made waterproof.

Suitable machinery and buildings are described for manufacturing the fuse.

[Printed, 1*s.* 2½*d.* These Letters Patent were the subject of litigation, and objections were urged against the Specification, but they were overruled in the Queen's Bench, and the Patent was sustained. See Webster's Reports, pp. 209, 211, 214; Webster's Patent Law, p. 106, also p. 139, cases 142 and 143; Register of Arts and Sciences, vol 7 (*new series*), p. 73; Engineers and Mechanics' Encyclopædia, vol. 2, p. 370; Carpmael's Reports on Patent Cases, vol. 2, pp. 449, 453, 454; Law Journal (Chancery), vol. 17. p. 188; Mylne and Craig's Reports, p. 498; Queen's Bench Reports, vol. 1, p. 938.]

A.D. 1831, September 24.—No 6166.

BINGHAM, William, and DUPE, William.—"Improvements "on fire-arms of different descriptions." Lock.

The Specification and drawings describe locks in which the mainspring is straight, the trigger in one piece with the sear and the hammer in one piece with the tumbler. A metal cover or case is used for inclosing the lock.

[Printed, 11¼*d.* See London Journal (*Newton's*), vol. 11 (*conjoined series*), p. 94; Register of Arts and Sciences, vol. 7 (*new series*), p. 99.]

A.D. 1831, December 15.—N° 6196.

MOSER, Abraham Adolphe.—"Improvements in certain "descriptions of fire-arms." Needle guns. (A communication.)

The detonating powder is attached to the wad placed in front of the powder and behind the projectile. The needle, actuated by suitable springs and levers, is thrust forward through a tube which passes through the powder chamber, and so ignites the powder in front.

When a cartridge or bullet is used of smaller diameter than the bore of the barrel, so that it may be loaded easily without a ramrod, the cartridge or bullet is held in its place in the barrel until it is discharged by a stud actuated by a spring, the point of the stud passing through the barrel at the requisite distance from the breech to hold the cartridge in its proper place. An elongated bullet intended for a musket is shown.

[Printed, 6½*d*. See Repertory of Arts, vol. 14 (*third series*), p. 16; London Journal (*Newton's*), vol. 11 (*conjoined series*), p. 159; Register of Arts and Sciences, vol. 7 (*new series*), p. 196.]

A.D. 1832, November 2.—N° 6326.

FOUCAUD, Leopold.—" Improvements applicable to the "priming of percussion locks of guns and pistols."

Self-acting apparatus and a tubular magazine for containing percussion caps and primers are connected with the lock, and supply the caps in succession as they are required.

[Printed, 6½*d*. See Repertory of Arts, vol. 15 (*third series*), p. 80; London Journal (*Newton's*), vol. 12 (*conjoined series*), p. 23; Engineers and Mechanics' Encyclopædia, vol. 2, p. 611.]

A.D. 1833, March 7.—N° 6394.

JONES, Charles.—" Improvements upon the percussion locks " of fire-arms."—A communication.

The cock, tumbler, and trigger are formed of one piece of metal of a curved shape, and the mainspring acts directly upon a projecting arm attached thereto. A portion of the invention described in the Specification was disclaimed.

[Printed, 5½*d*. See London Journal (*Newton's*), vol. 12 (*conjoined series*), p. 289.]

A.D. 1833, June 12.—N° 6436.

JONES, Charles—" Gun and pistol locks."

A lock of peculiar construction is described, the hammer is in one piece with the tumbler, the trigger and sear act on the same centre, with one common spring.

[Printed, 8½*d*. See London Journal (*Newton's*), vol. 12 (*conjoined series*), p. 290; also vol. 21 (*conjoined series*), p. 474, for Disclaimer.]

A.D. 1833, October 19.—N° 6491.

GILLYON, THOMAS AUGUSTUS GREGORY—" Improvements " on ordnance, and on the carriages and projectiles to be used " therewith."

Pieces of ordnance are made with two barrels connected at the breech so as to be fired at the same time from a common touch-hole. The axes of barrels are to be inclined at a small angle. The barrels are to be charged with chain shot, one shot in each barrel, the chain connecting being long enough to lie outside their muzzles. The slight divergence of the barrels is intended to ensure the balls diverging to the full extent of the chain.

The trail of the piece is formed in two parts connected together by a right and left handed male screw, taking into corresponding female screws in the two parts, so that by turning the screw the trail is lengthened or shortened, as may be required to raise or depress the piece.

[Printed, 4½*d*. See London Journal (*Newton's*) vol. 10 (*conjoined series*), p. 14.]

A.D. 1834, February 8.—N° 6554.

GILLETT, WILLIAM STEDMAN—" Improvements in guns and " other small arms." Stock and fitting.

The stock has a projecting piece like the butt of a pistol placed behind the trigger guard, so as to give a firm hold during the discharge,

The barrel is fitted in a grooved stock in which it is allowed to slide during the recoil, the breech comes against against a spring fixed on the stock, which is intended to break the recoil.

[Printed, 6½*d*. See Repertory of Arts, vol. 2 (*new series*), p. 136; London Journal (*Newton's*), vol. 5 (*conjoined series*), p. 109.]

A.D. 1834, March 13.—N° 6572.

MANTON, JOHN AUGUSTUS.—" Improvements in fire-arms." Priming apparatus. A self feeding magazine is formed in the stock for containing caps or primers, of a peculiar construction, and conical in shape.

[Printed, 5½*d*. See London Journal (*Newton's*), vol. 1 (*conjoined series*), *p. 91; Rolls Chapel* Reports, 7th Report, p. 160.]

A.D. 1834, May 22.—N° 6611.

HEURTELOUP, Charles L. Stanislas, Baron.—"Im-"provements on certain parts of certain descriptions of fire-"arms." Priming tube, breech loader, &c.

The detonating powder for the discharge is contained in a long tube made of soft metal or other suitable material. It is contained in a chamber or groove in the stock, and is advanced by suitable mechanism; a portion of the tube is cut off by a cutting edge or knife attached to the cock, and the part cut off is struck by the head and ignites the charge.

In the breech loading apparatus (which was subsequently disclaimed) the barrel is moved forward on the stock, and is bent down, "tilting up" the rear end, which is slightly enlarged, and exposing it to receive the cartridge or charge. In the rear of the cartridge is placed a round piece of wood or lead, cup-shaped. When the barrel is loaded it is pushed home against a plug or shoulder, which takes into the rear end of the barrel and rams the charge, and is fastened by a suitable catch or screw to the stock underneath.

[Printed, 1*s*. 0½*d*. An account of a similar invention to the one described above had been published by a Mr. de Valdahon in the Specification of his French Patent in 1821. In 1832 a copy of that Specification, contained in a French work, was deposited in the British Museum, constituting, in fact, a prior publication, and invalidating on that account Baron Heurteloup's Patent. On an application being made to the Privy Council, under the Act 5 & 6 William IV. c. 83., the Letters Patent were confirmed, and their validity established, notwithstanding the publication in the book in the British Museum, as the invention had not been actually used, but only described in the single work mentioned. See Webster's Reports, vol. 1,, p. 553; Webster's Patent Law, p. 19, 50, 56; also pp. 190, case 149; Carpmael's Reports on Patent Cases, vol. 1, p. 37.]

A.D. 1834, June 26.—N° 6633.

WALKER, Richard.—"An improvement in wadding for fire-"arms." The wadding is formed of thin metallic discs with perforations made therein to allow of the escape of air from the barrel when the charge is rammed home.

[Printed, 4½*d*. See Repertory of Arts, vol. 3 (*new series*), p. 95; London Journal (*Newton's*), vol. 6 (*conjoined series*), p. 34.]

A.D. 1834, September 16.—N° 6675.

SHRAPNEL, Henry.—" Improvements in fire-arms of various " descriptions, and in ammunition for the purposes of fire-arms." Sights, &c., and " Shrapnel " shell. These relate to :—

1. Moveable sights graduated and adjustable for certain distances.

2. Props turning on hinges to enable the piece to be used in a horizontal or vertical position, and to keep the hand far from the breech, in case of the gun bursting.

3. A moveable hinge or joint in the stock to enable it to be fixed at various angles to suit the shoulders of different persons.

4. The portion of the barrel just beyond the part that receives the powder is made to contract, to prevent the projectile from coming close to the powder; by means of this intervening air-chamber a much greater degree of effect will be produced by guns so constructed.

5. The hammers of flint locks are made with projecting sides to guide the sparks downwards to the pan.

6. The discharge is effected by detonating balls contained in a self-feeding magazine attached to the lock.

7. A prop is applied to pistols, so as to form a guard to beat off a sword cut.

8. Barrels of rifle guns are constructed with parallel grooves, by which means more correct firing will be obtained.

9. Two or more touch-holes are employed, in order more effectually to ensure the ignition of the charge.

10. Shrapnel shells are made by filling hollow shot with small shot, the interstices being filled with tin or some brittle metal. The outer case is so cast as to give way on striking an object.

11. For musket balls a compound of lead and tin is preferred, or iron washed with tin.

[Printed, 2*d.* See London Journal (*Newton's*), vol. 20 (*conjoined series*), p. 443.]

A.D. 1835, January 29.—N° 6755.

DODDS, Isaac.—" Improvements in machinery for cutting " and shaping wood and other materials, part or parts of which " machinery are applicable to other useful purposes."

The Specification and drawings describe machinery for shaping wood which is applicable to making gun-stocks, and other shaped articles.

[Printed, 9½*d.* See London Journal (*Newton's*), vol. 7 (*conjoined series*) *p. 121*; Rolls Chapel Reports, 7th Report, p. 158.]

A.D. 1835, April 28.—N° 6825.

SOMERVILLE, John.—" Improvements in the construction " of guns or muskets." Safety lock.

Moveable studs or pins are made " to protrude from under the " false breech before the hammers of the locks," which act as safety bolts and prevent the hammer from descending, except when the studs are removed by the pressure of the hand, at the time when the piece is discharged, such pressure not being caused by independent motion of the hand apart from the natural grasp. The Specification of prior Letters Patent is referred to. (See No. 2056, p.48.)

[Printed, 5½d. See London Journal (*Newton's*), vol. 7 (*conjoined series* , p. 193; Rolls Chapel Reports, 7th Report, p. 163.]

A.D. 1835, April 13.—N° 6826.

DODDS, Isaac.—" Improvements in the construction of fire- " arms," &c. Locks, revolvers, cannon with several barrels, boreing machinery.

Locks are described, of which the mainspring has a " greater " range of elastic action," owing to its fulcrum end being extended to a greater distance from the head of the spring. Among other improvements, a safety bolt is described.

Pistols are made with a revolving many chambered breech-piece mounted on a horizontal axis at right angles to the bore of a single barrel. The cock is actuated by a convolute spring.

Pieces of ordnance are constructed with two or more barrels connected together at the breech, and revolving round a common vertical axis.

The boring machine bores the barrel of the piece, while it is held in an inverted vertical position, a descending motion being given to the piece as the boring bit cuts away the metal, while the cuttings fall away by their own weight.

[Printed, 6½d. See London Journal (*Newton's*), vol. 10 (*conjoined series*), p. 279; Rolls Chapel Reports, 7th Report, p. 163.]

A.D. 1835, May 6.—N° 6829.

EGG, Joseph.—" Improvements on certain description of fire- " arms." Primers.

A self-acting tubular magazine for containing primers is attached to the barrel, in the case of double barrels it is placed between the barrels. Self-acting apparatus supplies the primers or detonating tubes to the touch-hole.

[Printed 5½*d*. See Repertory of Arts, vol. 6 (*new series*), p. 13.]

A.D. 1835, August 6.—N° 6872.

MASON, William.—" Improvements in the manufacture of " fire-arms and artillery." Hardening the bores or other surfaces.

The barrels are filled with animal charcoal and placed in a furnace at a red cherry heat for about two or three hours; they are then cooled in saline water. Other parts of fire-arms may be case-hardened externally by surrounding them with charcoal in the usual way.

[Printed 3½*d*. See London Journal (*Newton's*), vol. 9 (*conjoined series*), p. 343.]

A.D. 1835, October 22.—N° 6909.

COLT, Samuel.—" Improvements applicable to fire-arms." Revolvers with single barrel.

The Specification and drawings describe in minute detail the parts of " a revolver," and the mode of causing the breech-piece to rotate by a "lifter and ratchet" motion, and of locking it during the discharge by a key.

A shield is used to protect the lock from wet and smoke, and fouling. The axis of the percussion hole is in a line with the axis of the chamber. A sliding ram is used for striking the cap, the same being actuated by the hammer.

[Printed, 6½*d*.]

A.D. 1 36, March 22.—N° 7041.

WESTLEY, William Richards. — " Improvements in " primers," &c.

Copper caps are used of a large diameter; the detonating powder is not placed inside the head of the cap, but on a false bottom placed near the mouth, so that the explosion takes place near the mouth and only partially rends the cap.

To prevent any pieces from flying off, the cap is placed in an outer casing.

[Printed, 5½*d*. See London Journal (*Newton's*), vol. 9 (*conjoined series*), p. 15; Rolls Chapel Reports, 7th Report, p. 173.]

A.D. 1836, December 9.—N° 7250.

PRATT, SAMUEL.—" Improvements in the construction of knap" sacks," &c.

The Specification describes a method of dividing knapsacks into compartments conveniently arranged to hold many things in a small compass.

[Printed, 8*d*. See London Journal (*Newton's*), vol. 12 (*conjoined series*), p. 13; Rolls Chapel Reports, 7th Report, p. 182.]

A.D. 1837, January 11.—N° 7282.

GALL, JOHN.—" Improved mode of priming." The Letters Patent relate to percussion locks.

No Specification was enrolled.

A.D. 1837, January 19.—N° 7286.

POOLE, MOSES.—" Improvements in ordnance and fire-arms." —A communication.

The Specification and drawings describe a revolver. The discharging chambers are formed in the periphery of a cylinder revolving round a vertical axis. The cylinder is so constructed as to be easily removed, so that it may be replaced by a fresh one ready charged.

For ordnance the cylinder and chambers are by preference to be made to revolve on a horizontal axis.

[Printed, 6½*d*. See Repertory of Arts, vol. 8 (*new series*), p. 289.]

A.D. 1837, September 14.—N° 7472.

COLES, WILLIAM.—" Improvements in gunnery, and gun and " other carriages."

Pieces of ordnance are constructed in a star shape, each radius formed by a barrel, the piece being turned round as the barrels are discharged either vertically or horizontally.

A carriage for a railway is described on which guns are ranged in tiers.

Various improvements in railway carriages are also described.

[Printed, 1*s*. 4½*d*. See Repertory of Arts, vol. 9 (*new series*), p. 333; London Journal (*Newton's*), vol. 12 (*conjoined series*), p. 219.]

A.D. 1838, March 8.—N° 7582.

RICHARDS, WILLIAM WESTLEY.—" An improved primer for " fire-arms."

The primer consists of a tubular magazine affixed to the upper side of the piece. The tube is filled with caps, which are deposited successively as required upon the nipple by means of a lever and suitable apparatus moved by the thumb. The magazine is made self-acting by a spring so as to return to its proper place when released from the thumb.

[Printed, 1*s.* 1½*d.* See London Journal (*Newton's*), vol. 17 (*conjoined series*), p. 57.]

A.D. 1838, April 10.—N° 7610.

COOPER, Joseph Rock.—" Improvements in fire-arms."

These consist in, 1st, a peculiarly constructed lock wherein the hammer and nipple act inside the lock.

2nd. The nipples are lined and coated with gold, silver, or other metal, not easily injured by the explosion of the powder; parts of the barrels are also to be similarly protected.

3rd. A catch or bolt is applied to the lock to prevent it from being accidentally discharged.

4th. Stocks are made with wooden butts or handles, and German silver or other metal bodies and fore ends.

5th. Guns are made with the break-off and trigger plate in one piece.

[Printed, 9½*d.*]

A.D. 1838, June 30.—N° 7712.

ROUND, George, and WHITFORD, Samuel.—" Improvements in the manufacture of gun and pistol locks."

These consist in making " the plates, hammers, sears, tumblers, " bridles, and jaws " of locks, by means of stamps, dies, and presses (which are described), so that duplicates of the several parts are always produced, which may be interchanged at pleasure. The parts are also more easily finished.

[Printed, 6½*d.* See Repertory of Arts, vol. 11 (*new series*), p. 163.]

AD. 1838, August 2.—N° 7759.

DENNETT, John.—" Improvements in war rockets," &c., and in apparatus " for accurately pointing mortars."

Rockets are made with nipples on which are placed caps so as to explode by percussion, or a moveable plunger is used for the same purpose.

The long stick is dispensed with and a short solid or hollow bar or tube is used, having a counterpoise at the tail end, which may be made to contain an exploding charge, fired by a time fuse and ignited by the back fire. The charge itself may be protected from the back fire by a shield.

An apparatus for communicating with a wrecked ship is also described.

Mortars are pointed by means of a long rod adjusted so as to be concentric with the axis of its bore, and having at one end a graduated arc, from the centre of which depends a plumb line.

[Printed, 1*s*. 1½*d*. See Repertory of Arts, vol. 12 (*new series*), p. 222.]

A.D. 1838, August 30.—N° 7785.

BERRY, Miles.—Making epaulettes, &c.; a communication.

Machinery is described for weaving metallic tissues, military braids, &c., and making gold and silver lace.

[Printed, 7*d*. See London Journal (*Newton's*), vol. 17 (*conjoined series*), p. 64.]

A.D. 1838, November, 3.—N° 7853.

BERINGTON, James.—" Improvements in knapsacks."

Two straps carried over the shoulders and partly lined with plates of steel support the knapsack; they are attached to a belt going round the waist and connected by springs to the bottom of the knapsack.

[Printed, 5*d*. See Mechanics' Magazine, vol. 57, p. 34; Practical Mechanics' Journal, vol. 5, p. 119.]

A.D. 1838, November 15.—N° 7875.

BERNEY, Thomas French.—The Letters Patent relate to improvements in cartridges.

No Specification was enrolled.

A.D. 1839, February 11.—N° 7965.

MANTON, George Henry. — " Improvements in fowling " pieces and other fire-arms."

A circular magazine with self-feeding spring apparatus for supplying percussion caps is attached to the lock.

[Printed, 4½*d*. See Repertory of Arts, vol. 12 (*new series*), p. 219; Inventors' Advocate, vol. 3, p. 404.]

A.D. 1839, February 21.—N° 7970.

POOLE, MOSES.—"Improvements in epaulets, &c."—A communication.

Epaulets are made wholly of metal, except the lining, from which they may be detached to admit of their being cleaned with acids when tarnished.

Machinery is described for making metal fringes.

[Printed, 1*s*. See Inventors' Advocate, vol. 1, p. 67.]

A.D. 1839, February 23.—N° 7980.

HEURTELOUP, CHARLES L. S., Baron.—"Improvements in "fire-arms and in the balls to be used therewith." Primers.

These relate to a peculiar construction of lock for effecting the discharge by means of "a continual prime" (amorce continué). This is contained in a tube moved forward by a wheel actuated by the mechanism of the lock, and parts are cut off as required to effect a discharge.

Also for rifled arms the ball is expanded "by being pinched" between projections left at the bottom or breech of the barrel, and projections on the ram-rod which correspond with the grooves. The ram-rod is so made that it may be used as a bayonet. The ball is attached to the cartridge by a muslin envelope.

A part of the invention was subsequently disclaimed.

[Printed, 1*s*. 4½*d*. See Inventors' Advocate, vol. 1, p. 68.]

A.D. 1839, April 9.—N° 8024.

STOCKER, GEORGE and BENTLEY, JOSEPH.—"Improvements in guns, pistols, and other denomination of fire-arms." Lock. Revolvers.

1. An "explosion chamber" is formed in the breech, or it may be in the break-off, in which the nipple and discharge bolt or striker are placed in a line with the axis of the bore. The lock has two triggers acting in opposite directions, one of which cocks, the other discharges the piece.

2. The trigger guard when the piece is cocked holds the triggers fast, but it is released by the pressure of the hand while the finger pulls the trigger.

5. This trigger guard is applied to self acting revolvers these have also a protecting lip or "rim guard," which covers all the nipples except the one under the hammer, as is shown in a six-barrel revolver.

[Printed, 10½*d*. See Inventors' Advocate, vol. 1, p. 147.]

A.D. 1839, June 22.—N° 8119.

WILKINSON, Henry.—" An improvement in fire-arms." Locks.

The cock and mainspring of the lock are in one piece, and so are the trigger, sear, and tumbler. The mainspring and nipple are shown underneath the barrel. The mainspring is screwed at one end to the stock, the other end forms the cock, is pulled back by the thumb of the left hand, and is engaged in the notch of a plate attached to the trigger. On pulling the trigger the spring is released, and striking upwards discharges the piece. Percussion caps may be used, or priming pellets formed of detonating powder, fastened upon or between paper or cardboard discs; these may be contained in a tube, and are advanced successively and placed over the nipple, as required by self-acting apparatus.

[Printed, 5½*d*. See Inventors' Advocate, vol. 2, page 19.]

A.D. 1839, July 6.—N° 8143.

BERNEY, Thomas French.—" Improvements in cartridges."

Cartridges are made with two cases, an inner one formed of spiral wire for containing the shot, and an outer case of paper.

[Printed, 4½*d*. See Mechanics' Magazine, vol. 32, p. 493; Inventors' Advocate vol. 1, p. 19.]

A.D. 1839, August 23.—N° 8205.

COLES, Charles Barwell.—" Improvements in the method of " fixing and carrying fire-arms on horseback."

A leathern boot or holder is attached by an iron bar to the saddle so as to be either before or behind the knee of the rider. By this means a gun may be carried with its muzzle upwards, and within reach of the rider.

[Printed, 7½*d*. See Inventors' Advocate, vol. 3, p. 404.]

A.D. 1840, January 21.—N° 8347.

COOPER, Joseph Rock.—" Improvements in fire-arms and the " balls used therewith."

The Specification and drawings (which are numerous, and should be consulted in order to understand the variety of inventions shown,) describe, first, a simple construction of lock, in which two projections or bridle plates are attached to the lock plate in hook-formed openings, in which the axis of the tumbler turns, being borne up by the mainspring which is attached to the trigger plate. The hammer is attached to the axis of the tumbler.

A modification of this lock is shown, in which the piece is discharged by central fire.

Self-priming tubes are used, in which the caps are moved successively forward.

Revolvers are described having their nipples in a line with the axis of the barrels; by pulling the trigger, the hammer is thrown back and the barrels turned round; self-acting priming apparatus is attached thereto. A conical recess may be formed in the barrel, and a conically-shaped hammer is used, so that the priming is fired centrally.

Also projectiles are described having detonating powder placed in a recess formed in them, by means of which they are discharged. Nipples are screwed in from the inside of the breech.

[Printed, 2*s*. 1½*d*. See Inventors' Advocate, vol. 3, p. 67.]

A.D. 1840, February 8.—N° 8382.

HANCOCK, James.—" Waterproof military accoutrements, car- " touch boxes, caps, &c."

A base of wire work or other substance is covered with waterproof fabric made of india-rubber cloth.

[Printed, 4*d*. See London Journal (*Newton's*) vol. 23 (*conjoined series*), p. 170; Inventors' Advocate, vol. 3, p. 99.]

A.D. 1840, February 12.—N° 8385.

NAPIER, David.—" Improvements in the manufacture of pro- " jectiles."

Bullets and shot are made by compressing the lead between rollers, and suitably shaped dies, by the machinery described.

[Printed, 8½*d*. See Repertory of Arts, vol. 14 (*new series*), p. 257; Inventors' Advocate, vol. 1, p. 115.]

A.D. 1840, May 20.—N° 8513.

BUSH, William.—" Improvements in fire-arms and in cart- " ridges."—A communication. Breech-loader. Needle gun. Cartridges.

A sliding breech actuated by a lever works in a chamber in the rear end of the barrel. The needle is attached to the sliding breech, the front of which is formed of thin steel, having the centre part hollow and filled with pewter. This metal does not oxydize, it also yields with the elastic steel shield, and makes a tight joint through which the needle is projected. A suitable lock and cartridge for effecting the discharge by the needle are described.

[Printed, 10½*d.* See Mechanics' Magazine, vol. 33, p. 588; Inventors' Advocate, vol. 3, p. 371.]

A.D. 1840, July 18.—N° 8573.

POOLE, Moses.—" Improvements in fire-arms and in apparatus " to be used therewith."—A communication.

The nipple when the cap is upon it is covered by a recessed lever, mounted on an axis fixed in the side of the breech; the cap is thereby retained in its place. The blow of the cock is received upon this lever, and is thereby imparted to the cap which is exploded.

[Printed, 5½*d.* See Repertory of Arts, vol. 15 (*new series*), p. 328; Mechanics' Magazine, vol. 34, p. 78; Inventors' Advocate, vol. 4, p. 67.]

A.D. 1840, November 17.—N° 8704.

SHAW, Joshua.—" Improvements in discharging ordnance " muskets, fowling pieces, and other fire-arms."

A small "piston" or rod is used, which is passed through a small cylindrical touch-hole. Upon the end of the rod is the cap, which is struck through the powder chamber, and is exploded against the opposite side; or the cylindrical touch-hole is connected with the powder by a passage still smaller than itself, and a perforated percussion cap is used, which is exploded by striking it upon the shoulder or edges of the small interior passage, and the fire issuing through the bottom of the cap passes through the smaller passage, and so reaches the powder.

Instead of a cap the end of the rod may be made hollow, and contain detonating powder, the rods may be kept ready prepared with their caps or powder, in the gun-stock or elsewhere.

[Printed, 6½*d.* See London Journal (*Newton's*), vol. 26 (*conjoined series*), p. 71; Mechanics' Magazine, vol. 34, p. 399; Inventors' Advocate, vol. 4, p. 341.]

A.D. 1841, March 17.—N° 8885.

KORTRIGHT, Lawrence.—Preparing whalebone for ramrods, bows, &c.

The Specification describes suitable apparatus for steaming, pressing, and cutting whalebone, and manufacturing that substance into ramrods, &c.

[Printed, 1*s.* 1*d.* See London Journal (*Newton's*), vol. 21 (*conjoined series*), p. 443; Mechanics' Magazine, vol. 35, p. 288; Inventors' Advocate, vol. 5, p. 196.]

A.D. 1841, August 13.—N° 9047.

HALE, William, and DELL, Edward.—" Improvements in " cases and magazines for gunpowder."

The cases are made of cast or wrought tin, which is not injuriously affected by gunpowder, by preference in a hexagonal shape. The cover is fixed on by a screw, having portions of the periphery of the thread cut away, so that the cover may be put on and locked by a small turn. Within the cover is an elastic washer, by means of which an air-tight joint is formed.

[Printed, 6*d.* See Mechanics' Magazine, vol. 36, p. 143.]

A.D. 1841, September 6.—N° 9069.

DREW, Joseph.—" Cutting gun wads," &c.

The material for gun wads, if plastic, is rolled flat between rollers. Circular discs of the required shape are then punched out by punches which are fixed in a table. The table has a vertical up-and-down motion given to it while the sheet is passed under it.

[Printed, 6½*d.* See London Journal (*Newton's*), vol. 24 (*conjoined series*), p. 91.]

A.D. 1841, September 9.—N° 9084.

HEURTELOUP, Charles L. S., Baron.—" An improved manu" facture of continuous priming, and improved mechanism for the " application of the same to certain descriptions of fire-arms."

Continuous priming, when made " of 5 parts chlorate of potash, " 1 part of sulphur, and 1½ parts of charcoal, is liable to ignite " beyond the part struck," and may continue to burn like a slow match. Continuous priming that will not ignite beyond the part struck is made by using chlorate of potash by itself, or by mixing 48 parts of chlorate of potash, 1 part of sulphur, and 1 part of charcoal, all finely powdered. The mixture is put into tubes of pewter or other soft metal, about $\frac{1}{10}$ inch in diameter. Machinery is described for filling the tubes and rolling them into a flat form like tape. The continuous priming is rolled up into a coil, and in that form is used for discharging fire-arms; it is placed in a case above the breech, and by self-acting apparatus a small portion is projected above the nipple, and is cut off by the hammer just before the percussion takes place.

[Printed, 11½*d.*]

A.D. 1841, October 14.—N° 9119.

POOLE, Moses.—" Improvements in fire-arms."—A communication. Revolvers.

The Specification and drawings describe various constructions of revolvers in which a chambered breech-piece and single barrel are used.

The chambered breech-piece is made to turn by pulling the trigger, and the explosion may be effected by causing the nipples to strike successively against a moveable stop, or by means of a hammer which is made to cock itself by the action of the trigger.

A spiral spring, wound up by hand or key, like that of a clock, is used to give the motions to the breech-piece and lock; or the spiral spring may be used to raise the cock and turn the breech, while another spring, placed above it, releases the cock and discharges the piece.

[Printed, 6½*d.* See Repertory of Arts, vol. 18 (*new series*), p. 4; Mechanics' Magazine, vol. 36, p. 334.]

A.D. 1841, November 2.—N° 9129.

GOLDEN, William, and HANSON, John.—" Improvements " in fire-arms, and in the bullets and other projectiles to be used " therewith." Breech loaders.

The Specification and drawings describe breech-loading fire-arms, from which a cylindro-conoidal projectile is discharged by fulminating powder inserted in a recess in the projectile, and exploded by a needle.

The projectile is inserted by means of a horizontal perforated plug or " roller," which being turned half round, allows the projectile to be inserted through an opening in the top of the barrel.

With a spherical bullet the charge is to be contained in a box or chamber cemented to the bullet.

[Printed, 6½*d.* See London Journal (*Newton's*), vol. 22 (conjoined series) p. 342.]

A.D. 1841, December 14.—N° 9177.

RICHARDS, William Westley.—" Improvements in the " construction of gun and pistol locks and primers for the dis- " charge of fire-arms."

These relate to an improved form of mainspring. Instead of using hook or swivel, a boss with a circular face is attached to the end of the mainspring; this works in and bears on the curved side of the tumbler.

Also, the discharge is effected by " primers," consisting of detonating powder attached to pasteboard or foil or other suitable material, and covered on one side by a waterproof material. The primers are placed in a pan, of a dovetailed or other suitable shape, connected with the touch-hole, and are struck by a hammer of corresponding shape.

[Printed, 5½d. See London Journal (*Newton's*), vol. 1 (*conjoined series*), p. 331.]

A.D. 1841, December 16.—N° 9188.

STARKEY, Thomas.—" Improvements in percussion caps for " discharging fire-arms."

The caps consist of an outer and an inner case; the top of the inner case is perforated, and the detonating powder is placed between the tops of the two cases. A round piece of tinfoil or oiled silk is used to cover the detonating powder and make the caps waterproof.

Instead of using two cases, the detonating powder may be placed in a small inner case, and made waterproof by covering the powder with a disc of suitable material.

[Printed, 5½d. See London Journal (*Newton's*), vol. 21 (*conjoined series*), p. 85; Mechanics' Magazine, vol. 37, p. 262.]

A.D. 1842, February 15.—N° 9258.

ROUSSEAU, Alexander.—Improvements in fire-arms. Self-priming apparatus.

The caps are placed in a long tube in the stock, and are pressed forward by suitable springs and stops; the nipple is slanted backwards to receive the cap as it issues from the tube, and the mouth of the tube is made moveable, so as to move out of the way when the hammer strikes the cap on the nipple.

[Printed, 5½d. See Repertory of Arts, vol. 18 (*new series*), p. 278; Mechanics' Magazine, vol. 37, p. 350; Records of Patent Inventions, vol. 1, p. 31.]

A.D. 1843, March 20.—N° 9673.

ROLINSON, Solomon.—"Improvements in the manufacture of "shot."

Iron shot are to be made by cutting them by a saw or by shears from a cylinder of wrought iron (heated to a welding heat), and compressing them in a circular mould into a spherical form. The shot are then passed under a grooved roller, revolving above a strong frame or case made in the shape of a quadrant, and having grooves corresponding to those in the roller. The shot are thus made completely spherical, or the grooves may be adapted to other forms.

[Printed, 4½*d*. See London Journal (*Newton's*), vol. 24 (*conjoined series*), p. 118; Mechanics' Magazine, vol. 39, p. 241.

A.D. 1843, April 25.—N° 9712.

BROCKEDON, William. — "Improvements in the manufacture of wadding for fire-arms."

Cotton or other fibrous material is made into a cylindrical form like rope, and impregnated with size or gelatine and dried. Discs are then cut from the cylinder, and are pressed in a fly press into wads of a cup shape or of other suitable form.

Also wads are made of sheet metal by punching out from the sheet star-shaped pieces, the radial parts being truncated. These are pressed into a cup shape and are used as wads.

[Printed, 4½*d*.]

A.D. 1843, June 24.—N° 9801.

NEEDHAM, William.—"Improvements in fire-arms."

Nipples and primers or caps. The nipple has a slot in it from front to back, into this the primer is pushed; the hole in the upper part of the nipple is large enough to admit the point or punch of the hammer, which strikes down and explodes the primer while held in the slot above the touch-hole. The primers may be contained in a groove in the gun-stock, and be pushed forward successively by suitable self-acting apparatus as required.

[Printed, 6½*d*. See Repertory of Arts, vol. 3 (*enlarged series*), p. 85.]

A.D. 1843, July 24.—Nº 9851.

DAVIDGE, Joseph Daniel.—"Improvements in manufacturing certain materials as substitutes for whalebone," applicable to ramrods, &c.

Strips of metal are twisted spirally round a mandril, and afterwards are passed through groove rollers or a draw-plate.

[Printed, *6d.* See London Journal (*Newton's*), vol. 24 (*conjoined series*), p. 257.]

A.D. 1843, November 18.—Nº 9947.

ROOSE, James.—"Improvements in the mode or method of manufacturing gun barrels and ordnance." Welding barrels.

Twisted barrels are welded by passing the skelp at a welding heat through grooved rollers or a hole in a pair of dies.

The twisted skelp is placed on a maundrel having a swell on it some distance down, to prevent the barrel from being forced off it.

Ordnance is made by twisting a skelp of a sufficient size round a "taper maundrel," which is made hollow to allow water to be applied to its interior.

The maundrel projects from both ends of the twisted skelp, which is heated, and then one end of the maundrel is passed through a hole in the anvil, the other through a hole in the head of the hammer, which hammers on one end of the twist and forces it up together and welds it.

[Printed, 6½*d.* See Repertory of Arts, vol. 4 (*enlarged series*), p. 10.]

A.D. 1843, November 25.—Nº 9961.

FRITH, John.—"Improvements in the manufacture of cannon." Moveable breech.

A moveable breech is attached to the cannon, it is connected by steel rods and screws and nuts to the trunnions; when the breech is heated by repeated firing it may be removed, and a cool one fixed in its place. The cannon is cast, and is strengthened by wrought iron or steel hoops or rings shrunk while hot on the first reinforce.

[Printed, 3½*d.*]

A.D. 1844, January 11.—N° 10,008.

HALE, WILLIAM.—" Improvements in rockets."

War rockets are made to be discharged without a stick; the rocket is impelled forward, and at the same time made to rotate round its axis of progression, by allowing the composition to discharge its products of combustion through the open rear end of the case, and also through holes made in the case nearly in the direction of a tangent to its periphery.

The rotatory motion caused by the tangential fire keeps the rocket point foremost.

Various kinds of rockets are described and shown in the drawings.

The rear end may be weighted by an iron plug. In filling the case, a hollow portion is left in the axis, either by using a core or by boring out the composition.

The rockets may be made closed at both ends, and in that case the fire escapes from holes made in a shoulder of the case and directed in a backward direction. The case is made of metal, by preference of iron, with a lining of wood, veneer, or other suitable material.

[Printed, 5½*d.* [See Repertory of Arts, vol. 4 (*enlarged series*), p. 136; London Journal (*Newton's*), vol. 25 (*conjoined series*), p. 15.]

A.D. 1844, January 16.—N° 10,013.

ASPINWALL, THOMAS.—" An improved cannon, formed either " of wrought iron or steel, or wrought iron and steel combined, " and also instruments and machinery used in making, and a " method of making, said cannon."

The Specification and drawings describe machinery for welding together iron or steel rings or short cylinders end to end, so as to form a cannon either on a mandril or on a solid central bar.

The hydraulic press is employed in the welding process.

[Printed, 9½*d.*]

A.D. 1844, January 30.—N° 10,030.

SARGANT, WILLIAM LUCAS.—" Improvements in the manu- " facture of barrels for fire-arms." Cast steel barrels.

Barrels are made of cast steel by welding the edges of the skelp together; to one side of the skelp may be welded a plate of wrought iron, which will form the outside of the barrel, and is to be turned off afterwards; or a cylinder of cast steel is rolled out into a barrel.

The barrels may be subjected to a process of decarbonization by cementation.

[Printed, 6½*d*. See Repertory of Arts, vol. 4 (*enlarged series*), p. 259.]

A.D. 1844, March 14.—N° 10,109.

SEYMOUR, Thomas, and SEYMOUR, John.—" An improved " safety bolt and tumbler for the locks of certain kinds of fire- " arms."

The Specification and drawings describe a self-acting safety bolt, actuated by pressing a spring placed beneath the stock. The bolt acts on the tumbler and prevents the cock from falling from any position before it arrives at half-cock. A friction roller is applied to the tumbler to quicken the action of the sear.

[Printed, 6½*d*.]

A.D. 1844, July 30.—N° 10,280.

BENTLEY, Joseph.—" Certain improvements in fire-arms." Double barrels with central fire.

Double guns are made with the nipple hole, in a line with and slightly inclined to the axis of the bore, so as to give a central fire. The barrels have a single hutt, common to both. A chamber is formed in the side of the gun, in which the nose of the cock works.

[Printed, 5½*d*.]

A.D. 1844, October 24.—N° 10,364.

CARBINES, Henry.—" Improvements in fuses, cartridges," &c.

Military and miners' fuses are made by filling a short cylinder of lead with gunpowder and closing both ends, and then passing it with the powder inside through grooved rollers until it is elongated and attenuated to the required degree. Fuses are also made by enclosing gunpowder in twisted strands of metallic wire or fibrous material, rendered non-inflammable by any suitable means. Cartridges are also made of paper or other material rendered non-inflammable by applying suitable compositions.

[*Printed, 7½d. See Mechanics' Magazine, vol. 46, p. 494.*]

A.D. 1845, May 14.—N° 10,667.

SMITH, Charles James.—"Improvements in artillery, guns, "pistols," &c., "and in apparatus to be used therewith." Primers. Revolvers. Flasks.

The Specification and drawings describe self-feeding magazines which are attached to locks of fire-arms, and supply detonating primers; also revolvers with several barrels, which are turned, primed, and discharged by the trigger motion.

Also a powder flask, for charging simultaneously several barrels by means of several tubes attached to the flask.

Detonating primers are made waterproof by covering them with a waterproof material.

[Printed, 1*s.* 4½*d.*]

A.D. 1845, May 22.—N° 10,683.

BOCHE, Michel.—"Improvements in apparatus for measuring "charges of powder and shot."

A tube is attached to a perforated plug, which turns in a cylindrical case attached to the mouth of a flask.

When the tube is upright a charge of powder or shot can pass into it through the hole in the plug; when it is turned down, the communication between the tube and the flask is cut off, and the charge which it contains may be poured into the barrel to be charged.

[Printed, 6*d.* See Repertory of Arts, vol. 7 (*enlarged series*), p. 106.]

A.D. 1845, June 3.—N° 10,696.

WHITEHOUSE, Cornelius.—Improvements in machinery for welding and hammering, and in the manufacture of gun-barrels and other tubes.

The Specification and drawings describe machinery for welding gun-barrels on a mandril by means of revolving or rolling hammering surfaces. When the seam runs across the barrel, as in a twisted barrel, the barrel is held in dies, and a taper mandril with a steel collar is introduced into it, and is forced up, so as to push the joints into close contact while they are welded.

The tubes are finished by drawing them over a mandril on which are two circular swells, one of greater and the other of equal diameter with that desired to be given to the barrel when finished, and passing them with the mandril inside them between rollers.

[Printed 1*s.* 1½*d.*]

A.D. 1845, June 10.—No. 10,718.

TYSON, Joseph Washington.—"Improvements in fire-arms "and ordnance."—A communication. Primers.

These relate to continued primers formed by inserting fulminating mixture in a series of cups or hollows, pressed at regular intervals in a strip of paper or other suitable material, so that no two patches of prime may communicate.

The fulminating compound, consisting of 100 parts of fulminating mercury and 60 parts of gunpowder, is inserted in each hollow, and is covered with a strip of thin paper, and varnished.

The strips of primers may be coiled in a suitable case attached to the locks, and be unwound and placed over the touch-hole by means of a toothed feeding wheel and suitable stops and springs, actuated by the lock motions.

[Printed, 5½*d*. See Repertory of Arts, vol. 7 (*enlarged series*), p. 51.]

A.D. 1845, June 23.—N° 10,728.

ASPINWALL, Thomas.—" Improvements in ordnance carriages, " comprising apparatus for governing the recoil, and likewise for " moving the piece of ordnance backwards and forwards."

A revolving bar or spindle is attached underneath the gun-carriage, and round this is coiled a broad belt, which is attached to the ship's side or other fixed hold. As the piece recoils it unrolls the band, and so causes the bar or spindle to revolve. In order to check the recoil, a number of discs or friction plates are fastened on one end of the axis of the spindle; these rub against springs, and so gradually break the recoil. The gun is run up by means of a lever and rack motion, and the friction plates are released from contact with the springs.

[Printed, 6½*d*. See Repertory of Arts, vol. 7 (*enlarged series*), p. 99.]

A.D. 1845, October 2.—N° 10,849.

HALE, John.—" Improvements in guns." Safety lock. Self-priming apparatus, &c.

These relate, first, to a construction of safety lock wherein a bolt secures the cock until it is released by the hand grasping the stock. The rib has a convex form given to it, and the hammers are placed below the rib.

The primers, or patches, or caps used are moved forward and placed upon the nipple by self-acting apparatus. A second sight is added at a distance from the breech of about one-third of the barrel.

The under part of the stock, beneath the breech, is made of metal instead of wood.

[Printed, 6½*d.*]

A.D. 1845, November 6.—N° 10,928.

BICKFORD, John Solomon, SMITH, George, and DAVEY, Thomas.—" Improvements in manufacturing the miners' safety " fuze."

These relate to improvements upon the invention described in the Specification of Letters Patent granted to William Bickford, of September 6, 1831, (See No. 6159, p. 78,) and describes machinery for spinning several fuses at the same time.

A thread is passed down the centre of the powder in the fuse, and is kept in motion as the yarn is spun and the powder inclosed.

A non-inflammable coating, made of yellow soap and whiting, is employed for fuses to be used under water; a second coating of paper and varnish is given to the outsides.

[Printed, 5½. See London Journal (*Newton's*), vol. 29 (*conjoined series*), p. 312.]

A.D. 1846, April 21.—N° 11,173.

BISHOP, Peter.—" Improvements in the manufacture of " bayonets."

The bayonets are made with the ring and socket formed from the same piece of iron.

Tubing is used for making the sockets, and the neck of the bayonet is turned.

[Printed 6½*d.* See Patent Journal, vol. 1, p. 389.]

A.D. 1846, May 5.—N° 11,197.

CHURCH, William.—Improvements in machinery to be used in making caps and other articles.

The Specification and drawings describe stamping and punching machinery for making flanged percussion caps and other tubular articles.

[Printed, 4*s.* 6*d.* See Patent Journal, vol. 2, p. 717.]

A.D. 1846, October 8.—N° 11,407.

TAYLOR, John.—"Improvements in the manufacture of explosive compounds." Gun cotton, &c. A communication.

Vegetable substances, particularly cotton, are treated with acids. Nitric acid, of from 1·45 to 1·50 specific gravity, and sulphuric acid of 1·85 specific gravity, are mixed in proportion of 1 of nitric to 3 of sulphuric acid; the mixture is allowed to cool to about 60° or 50° F. The cotton is dipped into the mixture and allowed to remain until it is thoroughly impregnated therewith; it is then well washed in water, and finally in a weak solution of pure carbonate of potash, to remove all traces of acid. It is then dried and pressed, and may be subsequently dipped in a weak solution of pure nitrate of potash, which adds to its strength. The cotton may be dried in a temperature of about 150° F.

Nitric acid alone may be used; 3 parts by weight of the gun cotton are said to be equivalent to 8 parts by weight of "tower-proof" gunpowder.

[Printed, 3½*d.* See Repertory of Arts, vol. 9 (*enlarged series*) p. 292; London Journal (*Newton's*), vol. 30 (*conjoined series*), p. 253; Mechanics' Magazine, vol. 46, p. 358; Patent Journal, vol. 1, p. 283, and vol. 2, p. 771; Engineers and Architects' Journal, vol. 10, p. 142.]

A.D. 1846, November 12.—N° 11,447.

SMITH, George.—"A new safety fuze."

A cylinder or column of gunpowder is enclosed in a casing of gutta percha, so as to form a fuze. The gunpowder is placed in a narrow vertical cylinder, which is fixed in the centre of a wider one, in which the gutta percha is placed, surrounded by a steam case or jacket. The bottoms of the gunpowder cylinder and of the gutta percha cylinder both terminate in conical chambers, gradually tapering until they end in a pipe common to both. The gutta percha is pressed down in its cylinder by a piston, and as the powder issues from its cylinder guided by a centre thread, it is overtaken and covered in the common outlet pipe by the flow of gutta percha pressed out and round it by the action of the piston.

The gunpowder may be enclosed in twisted strands of fibrous or other material, and then covered with gutta percha by passing it through a pipe communicating with and issuing from the gutta percha cylinder at right angles to and near the bottom, the gutta percha being forced down as before by a piston with a pressure of about 500 lbs. per square inch.

[Printed, 5½*d.* See Mechanics' Magazine, vol. 46, p. 474; Engineers and *Architects' Journal*, vol. 10, p. 179.]

A.D. 1846, November 19.—N° 11,455.

BROCKEDON, William, and HANCOCK, Thomas.—Articles of india-rubber or gutta percha, as capes, gun-stocks, sword handles, &c.

The Specification describes various modes of treating and preparing india-rubber and gutta percha so as to vulcanize the substances, in which state they are made into waterproof articles. Gutta percha is moulded into a variety of articles, as gun and pistol stocks, sword handles, &c.

[Printed, 5*d*. See Repertory of Arts, vol. 10 (*enlarged series*), p. 103; Mechanics' Magazine, vol. 46, p. 504.]

A.D. 1846, December 15.—N° 11,493.

CAMPION, Jeremiah.—" Improvements in soldiers' belts," &c., and knapsacks.

The shoulder-straps are fastened both before and behind to the waist-belt; behind, they are fastened together upon the belt in the middle of the back; before, they are connected by hooks to two slides moveable on the belt.

The knapsack may be attached to the two shoulder-straps by separate short straps, and any pouch or other weight attached to the belt is supported evenly on the shoulders.

Or bent springs going over and resting evenly upon the shoulders may be used for supporting the knapsack, the springs being bent up behind, so as to form a ledge or shelf. The springs are to be properly padded.

[Printed, 1*s*.]

A.D. 1847, January 21.—N° 11,540.

DEAKIN, Thomas.—" Improvements in machinery to be used " in cutting, stamping, and pressing," &c. Caps.

The Specification and drawings describe machinery for punching and pressing sheet metal applicable to the manufacture of percussion caps.

[Printed, 1*s*. 7*d*. See Patent Journal, vol. 3, p. 234.]

A.D. 1847, April 30.—N° 11,657.

MOLLETT, John. — " Improvements in fire-arms and cart" ridges."

The Specification and drawings describe guns for firing balls with a fulminating charge, consisting by preference of 2 parts of fulminating mercury and 1 of gunpowder.

The breech terminates in a very narrow chamber, into which a pointed hammer strikes so as to explode the charge.

The vent and inside of the chamber may be lined with gold, or silver, or platinum, or other resistant metals.

The cartridge paper used may be rendered highly combustible by treating it with nitric and sulphuric acids, or those acids and zuloidine, which is obtained by dissolving British gum in nitric acid.

The paper leaves little or no residuum.

Gun cotton may be used for the charge.

[Printed, 9½*d*. See Mechanics' Magazine, vol. 47, p. 419.]

A.D. 1847, September 9.—N°. 11,864.

O'LEARY, CONNOR WILLIAM. — "Improvements in the "methods of producing power for the discharge of weapons and "missile for warlike and other purposes."

Compressed air is proposed to be used on a large scale for discharging projectiles from large ordnance on the air-gun principle. Any machinery or motive power, as a locomotive or windmill, may be used for working the piston and cylinder to compress the air into a receiver.

One man is said to be able to work a gun that will throw a projectile weighing half a ton "with ease and precision."

[Printed, 8½*d*. See Patent Journal, vol. 4, p. 473.]

A.D. 1847, September 30.—N° 11,880.

BARROS, IGNACIO DE. — "Improvements in machinery for "making lasts for boots and shoes, butts or stocks for fire-arms, "and other irregular forms."—A communication.

The Specification and drawing describe machinery constructed on two principles, in one of which circular saws, and in the other reciprocating saws, are used. "One or two patterns made of cast "iron of the exact shape and size of the articles required to be "fashioned are placed in each machine," and are acted upon by tracers or guides, which, by being in contact with their surface, are made to follow all the irregularities thereof, by that means the saws are guided in their cut and direction, and reproduce counterparts of the patterns from the blocks on which they are made to act.

[Printed, 1*s*. 6½*d*. See Patent Journal, vol. 4, p. 469.]

A.D. 1847, December 10.—N° 11,994.

TAYLOR, Stephen.—" Improvements in the construction of " fire-arms and in cartridges," &c.

These consists in the use of a conical shaped projectile, the charge of powder being inserted in a hollow formed in the rear end of the projectile, which is closed by a cap provided with a touch or match-hole for igniting the charge by means of gun cotton or other explosive matter.

The projectiles are to be contained in a magazine consisting of a self-acting feeding tube, which is attached to the barrel of the piece, and as one projectile is discharged another is to be pushed forward into the breech of the barrel and fired in succession.

[Printed, 11½*d.*]

A.D. 1848, January 31.—N° 12,048.

NEWTON, Alfred Vincent.—" Improved machinery for " manufacturing shot and other solid balls."—A communication. The Specification and drawings describe stamping and polishing machinery for making spherical balls or shot.

Lead, in the form of sheet or bar lead, is pressed or stamped between two hemispherical sharp-edged cups, one having a reciprocating motion, the other being stationary, and is so formed into balls. An aperture is made in one of the cups to allow of the escape of any surplus lead.

The balls are afterwards smoothed and polished by passing them between a plate, and a disc having a volute groove formed in its face so that the ball is rolled and pressed from one end of the groove to the other. Or the balls may be polished in a spiral groove formed in the periphery of a conical block, which turns in a case with a plane face. These grooves may be lined with leather.

[Printed, 7½*d.* See London Journal (*Newton's*), vol. 24 (*conjoined* p. 11; Artizan, vol. 6., p. 250; Patent Journal, vol. 5, p. 278.]

A.D. 1848, February 8.—N° 12,059.

PIGGOTT, William Peter.—" Improvements in nautical " instruments, and in the manufacture of cases for containing " instruments," &c. Vulcanised india-rubber or gutta percha is used for covering telescopes, or for making cartouche boxes, by covering wooden cases with sheets of the vulcanised material.

[Printed, 7*d.* See Repertory of Arts, vol. 12 (*enlarged series*), p. 320; London Journal (*Newton's*), vol. 33 (conjoined series), p. 107; Artizan, vol. 6, p. 273; Patent Journal, vol. 5, p. 369.]

A.D. 1849, January 11.—N° 12,406.

LOAM, MICHAEL.—"Improvements in the manufacture of "fuzees," or fuses. The Specification and drawings describe machinery for forming a tube of calico, or other suitable material, and filling it with gunpowder to form a fuse. The tube is covered with strands of cord or other suitable material, and coated with a waterproof substance.

[Printed, 9½d. See Repertory of Arts, vol. 14 (*enlarged series*), p. 77; London Journal (*Newton's*), vol. 35 (*conjoined series*), p. 17; Mechanics' Magazine, vol. 15, p. 44; Patent Journal, vol. 7, p. 238.]

A.D. 1849, January 20.—N° 12,432.

NEEDHAM, HENRY.—"Improvements in fire-arms." Self-priming apparatus and safety lock. Tubular channels for holding caps are formed in the stock, and the caps are placed upon the nipple by self-acting apparatus actuated by the cock. A lever acts as a catch to prevent the cock or hammer from acting except when the catch is relieved by the pressure of the hand when the piece is fired.

[Printed, 4½d. See Mechanics' Magazine, vol. 51, pp. 91, 127; Practical Mechanics' Journal, vol. 2, p. 152; Patent Journal, vol. 7, p. 183.]

A.D. 1849, March 14.—N° 12,519.

DE BARROS, IGNACIO.—The Letters Patent relate to improvements in machinery for making casts, gun-stocks, &c.

No Specification was enrolled. See Patent No. 11,880, p. 104.

A.D. 1849, March 28.—N° 12,543.

MANTON, GEORGE HENRY, and HARRINGTON, JOSIAH.—"Improvements in priming and in apparatus for discharging fire-"arms."

The priming apparatus is self-acting. The caps are contained in a tubular magazine made in the stock beneath the barrel. The piece is primed by the act of moving the ramrod and returning i to its place (supposing the hammer to be previously raised from the nipple); this motion pushes forward a percussion cap, and deposits it upon the nipple.

[Printed, 1s. 1½d. See Repertory of Arts, vol. 14 (*enlarged series*), p. 356; Mechanics' Magazine, vol. 51, p. 327; Patent Journal, vol. 8, p. 16.]

A.D. 1849, April 3.—N° 12,559.

WOOLLETT, Alfred.—" Improvements in gun carriages."

The Specification and drawings describe a gun carriage which is formed in two parts, connected by a vertical bolt passing through both. The under side of the upper part is covered with a wrought iron plate moving round the vertical bolt, in contact with a cast iron plate on the upper side of the lower part. A graduated arc is attached to the carriage, to enable the gun to be accurately pointed. It may be trained 45° on each side of the centre of the port.

Apparatus for breaking the recoil is described.

[Printed, 5½*d*. See Repertory of Arts, vol. 14 (*enlarged series*), p. 265; London Journal (*Newton's*), vol. 35 (*conjoined series*), p. 259; Mechanics' Magazine, vol. 51, p. 335; Patent Journal, vol. 8, p. 18; Engineers' and Architects' Journal, vol. 12.]

A.D. 1849, May 15.—N° 12,613.

CHATAUVILLARD, Louis Alfred de.—" Improvements in " fire-arms, bullets, cartridges, bayonets, and ordnance."

The Specification and drawings describe breech-loading arms, in which a sliding breech moved by a lever is used, upon the principle called " Montigny's system."

Also a peculiar construction of lock, and priming apparatus, and bayonet.

[Printed, 1*s*. 1½*d*. See Mechanics' Magazine, vol. 51, p. 500.]

A.D. 1849, May 29.—N° 12,623.

HODGES, Richard Edward.—" Improvements in mechanical " purchases, which are also applicable in whole or in part to pro- " jectiles."

These consist in the use of a number of elastic strands; each one being stretched singly exerts a small resilient force, which increases in aggregate as the number of single strands is increased.

The principle is applied in various ways; amongst others to hurl projectiles from tubes on the principle of a crossbow.

[Printed, 11½*d*. See Repertory of Arts, vol. 17 (*enlarged series*), p. 345; Mechanics' Magazine, vol. 51, pp. 546, 553; also vol. 55, pp. 350, 376; Patent Journal, vol. 8, p. 114.]

A.D. 1849, May 29.—N° 12,624.

SMITH, David.—"Improvements in the means of manufacturing "certain articles in lead." Shot, &c.

Molten lead is dropped into an enclosed receptacle, into which compressed air is injected, and is so made to encounter in a short descent as great a volume of air as it would encounter in falling through the air from a high tower.

[Printed, 5½*d.* See Mechanics' Magazine, vol. 51, p. 545; Patent Journal, vol. 8, p. 117.]

A.D. 1849, June 7.—N° 12,648.

RITCHIE, William Henry.—"Improvements in fire-arms." Self primers. Breech loaders. The Specification and drawings, which are numerous, describe, firstly, self-acting priming apparatus for pushing caps out of a tubular magazine contained in the stock, and depositing them on the nipple. The nipple moves through a small arc to receive the caps; or the caps may be made square, and have one side removed, so that they may be easily pushed upon the nipple. Also various modes are shown of exploding the powder by means of a perforated tube containing fulminating powder, which passes entirely through the charge and ignites every part at once.

Breech-loading arms are described; the barrel is connected with breech by a male screw, which works in a female screw cut in the barrel. The barrel turns on centres to enable it to be charged at the exposed rear end.

Projectiles are shown of a conical shape, and having a recess in their rear end, so that "the ball is forced against the sides of the "barrel," which is rifled.

[Printed, 1*s.* 7½*d.* See Mechanics' Magazine, vol. 51, p. 574; Patent Journal, vol. 8, p. 164.]

A.D. 1849, June 20.—N° 12,666.

GRIFFIN, Charles James Coverly.—"Improvements in "military accoutrements," as sword scabbards.

Sword scabbards are made in two or more parts, which slide one within the other like telescope joints, so that when the sword is drawn the scabbard collapses, and becomes so short as to offer no impediment to the wearer.

This is done in various ways by means of self-acting springs, or catches drawn up with the sword, or by attraction between properly-placed magnets, and soft iron parts of the scabbard.

When the sword is sheathed, the point pushes a soft cushion, and again extends the parts.

[Printed, 6*d*. See Mechanics' Magazine, vol. 51, p. 617; Patent Journal, vol. 8, p. 282.]

A.D. 1849, June 20.—N° 12,668.

COLT, Samuel.—" Improvements in fire-arms." Revolvers.

These relate to improvements upon the construction of revolving fire-arms, described in the Specification of a former Patent, dated October 22, 1835. (See No. 6909, p. 84.)

The lock frame and recoil shield are made in one piece.

The rotating chamber breech-piece, containing six chambers, more or less, is made to rotate on an arbor or spindle, which is welded to and forms part of the lock frame. The barrel is fixed firmly on the end of the spindle by making the latter fit into a socket in a bracket piece forming one with the barrel, and by introducing a key through suitable slots in the bracket and spindle. The breech-piece is turned on its spindle by means of a pall or catch connected with the hammer, which, when the hammer is cocked by hand, takes into ratchet teeth formed on the rear face of the breech-piece, and pushes the breech-piece round. When the hammer is at full cock, and the axis of one of the chambers is in a line with the axis of the barrel, the breech-piece is locked by means of a rocking lever working on a pin in the lock frame, beneath the breech-piece, which has on its head a projection that takes into a recess in the periphery of the breech-piece. The recesses have sunken guides or channels leading to their lips, to ensure the bolt taking into them at the right time, there being a recess corresponding to each chamber.

The lever is unlocked by the action of a stud attached to the hammer, which, when it is at half-cock, withholds the projection on the lever from the recesses, and so admits of the breech-piece being turned by hand while the chambers are loaded.

The charges are rammed by a jointed lever ramrod, the long arm being moved round a pin attached to the bracket of the barrel, gives a reciprocating motion to a plunger or ram parallel to the axis of the barrel, and in a line with the axis of one of the chambers which is brought opposite it.

The inner edges of the mouths of the chambers and of the end of the barrel are recessed. A helical groove is cut in the spindle to intercept and throw off accumulated fouling, and prevent its clogging the motion of the breech piece.

[Printed, 10½d. See London Journal (*Newton's*), vol. 36 (*conjoined series*), p. 90; Mechanics' Magazine, vol. 51, p. 619; Patent Journal, vol. 8, p. 177.]

A.D. 1849, August 1.—N° 12,728.

SHAW, John.—" Certain improvements in air guns."

Sufficient pressure of air is to be instantly obtained at the pull of the trigger, by connecting a piston working in an air cylinder in the rear of the barrel with a strong india-rubber spring. The spring is contained in a case underneath the barrel, and is attached to the head of the piston; by the action of the trigger the spring is released, the piston is dragged from the far end of the air cylinder to that in contact with the rear of the barrel, and discharges the bullet by the compressed air.

[Printed 6½d. See Mechanics' Magazine, vol. 52, p. 114; London Journal (*Newton's*), vol. 36 (*conjoined series*), p. 301; Practical Mechanics' Journal, vol. 3, p. 30; Patent Journal, vol 8. p. 237.]

A.D. 1849, August 1.—N° 12,732.

AINGWORTH, Benjamin.—" Improvements in ornamenting " iron and other metals for use in the manufacture of gun barrels," &c.

Sheets or ribbands of steel perforated or shaped in designs, or steel wire, or steel in other forms, may be incorporated by welding with iron skelps intended to be made into gun barrels. The steel is thereby intermixed with the iron and produces ornamental surfaces.

[Printed, 4½d. See Mechanics' Magazine, vol. 52, p. 119; Patent Journal, vol. 8, p. 235.]

A.D. 1849, September 20.—N° 12,781.

COOPER, Joseph Rock.—" Improvements in fire-arms." Locks. Revolvers.

These relate first to a simple construction of lock. A long plain spring is attached underneath the barrel, its loose end forms a hammer, which is raised by a catch connected with the trigger, and being released, when the trigger is drawn back to its full extent, strikes upwards upon the nipple, which is fixed underneath the barrel. The end of the ramrod may be made to act as a spring when it is put into its place beneath the barrel.

A revolving six-barrel fire-arm is described, in which the barrels are turned, and the lock cocked and discharged by one motion of pulling the trigger.

[Printed, 10½d. See Repertory of Arts, vol. 15 (*enlarged series*), p. 287; Mechanics' Magazine, vol. 52, p. 239; Patent Journal, vol. 9, p. 180.]

A.D. 1849, December 29.—N° 12,911.

CHARPILLON, Louis Cesaires.—The Letters Patent relate to improvements in gun and pistol locks.

No Specification was enrolled.

A.D. 1850, January 11.—N° 12,920.

SEARS, Matthew Urlwin.—" Improved construction of guns " and cannons, and manufacture of cartridges," &c. Breech-loading needle gun.

A cylindrical chamber is either attached to the rear end of the barrel by a screw, or forms a part of the barrel itself. A cylindrical tube forming a sliding breech-piece slides backwards and forwards in the chamber, it is moved by a handle which projects through a slot.

When the piece is to be charged, the sliding breach is drawn back and discloses an enlarged part of the chamber and the rear end of the barrel; into this the cartridge is inserted, the sliding breech is pushed up to the barrel and its handle is then locked against a shoulder. The fore part of the sliding breech is enlarged conically, and the end of the barrel is conical on its exterior; on the front of the breech is a ring or washer of soft brass or copper to " improve the shutting " and make a fast joint. Just behind the ring is a back chamber to receive the fouling residuum, and also contain air, which by its elasticity, eases the recoil, and being heated expands and increases the force of the explosion.

The mechanism for actuating the needle is contained in another tube sliding in the back part of the breech-piece or chamber. The needle is actuated by a main spiral spring capable of bearing a weight of 16 or 18 lbs. It may be only partially pushed forward, so that the piece is then at half-cock. The needle is projected through a diaphragm in the air chamber, and piercing through the rear of the cartridge, strikes a percussion patch placed on a disc of cardboard between the bullet and the powder, and so ignite the charge in front, which is said completely to consume the powder.

The bullet is conical, and has grooves and raised ribs or rings at the rear end.

The principle may be applied to ordnance, when a rack or other suitable apparatus may be used for moving the sliding breech-piece.

[Printed 11½*d*. See Mechanics' Magazine, vol. 53, p. 54; Practical Mechanics' Journal, vol. 2, p. 214; vol. 4, p. 177, and vol. 5, p. 175; Patent Journal, vol. 9, p. 175.]

A.D. 1850, March 7.—Nº 12,990.

STONES, William Benson.—" Improvements in treating peat," &c., as charred peat, for making gunpowder.—A communication.

The Specification and drawings describe apparatus for carbonising peat, and manufacturing its products by distillation and other process into various substances suited for combustion, and other purposes.

The charred peat is impregnated with sulphur to fit it for being used in the manufacture of gunpowder.

[Printed, 1*s*. See Repertory of Arts, vol 17 (*enlarged series*), p. 16; Mechanics' Magazine, vol. 53, p. 219; Patent Journal, vol. 9, p. 284.]

A.D. 1850, July 3.—Nº 13,161.

LANCASTER, Charles William.—" Improvements in the " manufacture of fire-arms and cannon, and of percussion tubes." Rifles. Oval bores, &c.

The Specification and drawings first describe rifled cannon and fire-arms having a spiral, whose transverse section may be an ellipse or a curvilinear, trilateral, or quadrilateral figure, or partly curvilinear and partly rectilinear. The piece is first bored with a true circular bore, and the shape of the oval or other curvilinear figure is formed by taking off the bore longitudinal cuts, whose " edges or sides form tangents with the circular bore of the barrel, " in which they are made." The cuts may be made by ordinary cutting or rifling machines, but special rifling machinery is described. The cannon is fixed upon a longitudinal frame, which " slides," and traverses " over and against" V-shaped projections, forming the upper edges of the bed. The cutter shaft works eccentrically in *a tube of the same* diameter as the cannon before being rifled; the cutter is set out by means of an incline or wedge-shaped bar, which passes through the tube, and is moved by a spanner and nut fixed outside the tube on the screwed end of the bar.

The cannon and its moveable frame are moved by a screw actuated by the driving apparatus, until the cutter and its tube arrive at the breech end; the cutting tool is then set in motion, the tube and eccentric cutter shaft being made to rotate in contrary directions; the cutter is gradually set out so as to take a gradually deepening cut, at the same time the spiral twist is given to the cut by making the cannon turn on its axis, by means of a forked lever connected with its muzzle, which engages with a transverse beam crossing from one side to the other underneath the frame, and extending through the length of the piece. Percussion tubes are made of softened leather.

[Price 1*s*. 6½*d*. See Patent Journal, vol. 10, p. 319.]

A.D. 1850, October 6.—N° 13,215.

MELVILLE, ALEXANDER, and CALLOW, EDWARD.—" Im-" provements in muskets, cannon, and other fire-arms, and in " explosive compositions and instruments." Breech-loaders.

The Specification and drawings describe:—

1st. Breech-loading muskets. The barrel is connected with a hinged breech-piece by a quick-threaded screw; half a turn disengages the barrel, and the breech-piece is thrown up by the trigger spring; or the barrel and breech-piece are made with accurately fitting faces and the joint is covered with a sliding hoop moved by a lever.

2nd. Breech-loading cannon are described of various constructions; two plugs may be used, the forward one longitudinal, which may be withdrawn by a rack and pinion, the second one transverse acting like a bolt, and moved by a wheel and screw; or a single taper transverse plug is made to contain the charging chamber; this is protruded by a screw from the side of the piece, and the charge is inserted in its chamber, it is then drawn back to its place; or a longitudinal sliding plug is used, which uncovers or closes a loading aperture in the upper side of the piece; or a tap plug is used perforated with a hole corresponding with the bore; the guns should be made of wrought iron.

3rd. Cannon may be mounted on stationary beds turning on a centre, and connected below with a frame having slides and springs, so that the recoil is broken.

4th. Explosive compounds are used instead of gunpowder, they are compounded of—

	Parts.	
1st.	2	chlorate or oxymuriate of potash.
	1	orpiment or red sulphuret of arsenic.
2nd.	5	chlorate of potash.
	1	prussiate of potash.
	2	orpiment.
3rd.	1	chlorate of potash.
	1	prussiate of potash.

The ingredients are well mixed, damped, and moulded into cartridges for fire-arms; and exploded by the percussion of a needle.

4th. The compounds are used for mining purposes and for charging shells, and arrow-shaped projectiles.

[Printed, 1*s.* 6½*d.* See Mechanics' Magazine, vol. 54, p. 134.]

A.D. 1850, October 24.—N° 13,299.

ROSE, Aaron.—" Improved methods of manufacturing twisted " gun and pistol barrels."

A rod of iron or steel, or composed partly of both metals, is twisted round a mandril by means of a rotating shaft. The head of the mandril is square, and is fixed in a square hole in the axis of the shaft. The end of the rod is held by a hook or clutch attached to the mandril, and the rod is twisted round it. It is afterwards welded under a tilt hammer, and then reheated and again hammered. Subsequently it is passed through grooved rollers.

[Printed, 3½*d.* See Mechanics' Magazine, vol. 54, p. 339; Patent Journal, vol. 11, p. 48.]

A.D. 1850, November 30.—N° 13,377.

ELMSLIE, James Augustus, and SIMPSON, George.— " Improvements in sheathing ships, &c.," and in making cartridges and gun wads.

Tin foil is used for sheathing ships, also for making cartridges for guns and cannon. A thin wire or needle is passed down the centre of the cartridge, so that when it is rammed home the needle *breaks the* bottom of the cartridge, and allows the powder to escape.

Wads are made of vegetable incombustible matter, such as refuse or spent hops. They are to be steeped in a solution of alum or lime, then pressed into sheets, and punched into wads, which may be covered with tin foil.

Tin foil may also be used for making the cases of fire-works.

[Printed, 5½d. See Mechanics' Magazine, vol. 54, p. 457; Patent Journal, vol. 11, p. 218.]

A.D. 1850, December 12.—N° 13,403.

HOWELS, Thomas Hoskins. — "Improvements in gun-carriages."

The Specification and drawings describe a gun-carriage, having on the rear axle a pair of castor rollers; two fixed projections are also attached to the rear axle, on the bottom of which are placed plates of metal called "friction plates."

Two levers are used to throw the weight on the rear trucks when the piece is to be run out or trained, and the weight is allowed to rest on the fixed friction plates during the recoil.

[Printed, 6½d. See London Journal (*Newton's*), vol. 38 (*conjoined series*), p. 330; Mechanics' Magazine, vol. 54, p. 298; Patent Journal, vol. 11, p. 204.]

A.D. 1851, Januuary 16.—N° 13,454.

LANCASTER, Charles William.—"Improvements in the manufacture of fire-arms and cannon, and of projectiles."

These relate, firstly, to improvements made in the boring apparatus described in the Specification of former Letters Patent, see No. 13,161, p. 112, by using a divided collar on the boring tube to make it fit the bore of the cannon, and packing to prevent the cuttings getting between the tube and the gun.

2nd. Projectiles (such as are to be used with the cannon described in the said Specification) are cased or covered with an elastic covering, or belt, or packing of rope or caoutchouc, or such projectiles may be made with expanding or spreading backs, made of sheets of copper formed into a cap shape, and attached by screws or solder to the rear end of the projectile. The expanding back is to fill up the oval bore and cause the rifling effect. The hinder parts of such projectiles may be made with a yielding wad attached to the cast iron body by a tie rod and wrought iron discs, which may be circular. The hinder parts of such projectiles may be made with wedges, so as to split and expand a wooden wad placed in contact with them.

point. The degree of twist may be increased or diminished by setting the incline fixed beneath the bed at a greater or less elevation as required, and so moving the rack vertically faster or slower, and turning the pinion and carrier rod with a corresponding degree of motion.

At the same time by pushing the wedge-shaped point to a greater or less distance in the tool cylinder (by means of a rod passing through the barrel entering at the breech) the cutting tool is more or less set out, and the cut may be made gradually to deepen from the muzzle to the breech.

A variety of adjustable sights are also described.

Conically shaped projectiles are used, having variously shaped recesses in their rear ends, and grooves on their peripheries to facilitate the expansion of the metal into the rifle grooves.

[Printed, 10½*d*. See Mechanics' Magazine, vol. 57, p. 101.]

A.D. 1852, January 29.—N° 13,935.

WINIWARTER, Joseph, M. R. von.—" Improvements in the " locks of fire-arms, and cannon, and in gun matches."

A suitable nipple is used for firing gun matches, which are made from a composition consisting of:—

	Parts.	
1st.	300	Fulminating mercury.
	288	Chlorate of potass.
	312	Sulphate of antimony.
	60	Charcoal and saltpetre mixed, the proportions being 16·7 charcoal, 63·3 saltpetre.
	23	Ferrocyanide of potassium.
	6	Binoxide of lead.
	900	Etheroxylin { pyroxylin, 75. ether, 150.
2nd.	75	Fulminating zinc.
	4	Chlorate of potass.
	7	Sulphate of antimony.
	15	Binoxide of lead.
	224	Etheroxylin.
	1	Ferrocyanide of potassium.
3rd.	75	Amorphous phosphorus.
	64	Binoxide of lead.
	15	Charcoal and saltpetre.
	106	Etheroxylin.

Machinery for mixing the ingredients and making matches is described. These compositions made into suitably shaped pellets may be used in cup-shaped nipples for discharging fire-arms by percussion.

[Printed, 1*s.* 2½*d.* See Mechanics' Magazine, vol. 57, p. 135.]

A.D. 1852, February 27.—N° 13,991.

REEVES, Charles.—" Improvements in the manufacture of " bayonets, swords," &c.

Iron or steel is rolled into bars having a section suited to form a bayonet or sword. The bar is cut into suitable lengths and the pieces are passed between grooved rollers, having taper grooves of the proper form to give the sectional figure required.

[Printed, 5½*d.* See Mechanics' Magazine, vol. 57, p. 219.]

A.D. 1852, March 3.—N° 13,994.

KUFAHL, George, L. L. — " Improvements in fire-arms." Needle guns.

The Specification and drawings describe a breech-loading needle gun. The needle and its guide are carried in a tube sliding in a cylindrical chamber in the rear of the barrel, being moved by a handle projecting through a slot and locked during discharge in a side slot against a shoulder.

The sliding tube is so constructed that the breech cannot be opened while the tumbler is engaged, or while the needle protrudes from its guide, and when the tubes are drawn back for the purpose of loading the piece, the needle is disengaged from the tumbler and lock apparatus.

To secure a perfect joint between the end of the barrel and that of the sliding tube, they are made with bevelled edges to correspond, or a thin tube of elastic yielding metal is used.

A needle lock revolver, with a cylindrical chamber piece, and a single barrel is also described. The chamber piece has a reciprocating movement on its axis, so that the lip of a thin elastic tube inserted in each charging chamber is engaged in the rear end of the barrel during discharge, and disengaged therefrom to enable the chamber piece to turn on its axis.

[Printed, 7½*d.* See Mechanics' Magazine, vol. 57, p. 236; Practical Mechanics' Journal, vol. 5, p. 105.]

A.D. 1852, March 20.—N° 14,027.

RICHARDS, WILLIAM WESTLEY.—" Improvements in fire-arms " and in the means used for discharging the same, also improve- " ments in projectiles." Revolvers, bullets, plugs of wood, &c.

The Specification and drawings describe, first, revolving pistols with a single barrel and a cylindrical breech piece. The breech piece is turned by means of a horizontal slotted lever, which is actuated by the trigger; the fore end of the lever engages under radial teeth projecting from the axis of the barrel.

The barrel is locked during discharge by a slide, also actuated by the trigger, which holds one of the teeth above, while the lever holds it below. The motion of pulling the trigger turns the barrel, and also raises and discharges the hammer.

The revolving breech piece is made to turn on a strong axis, connected with the barrel by a journal or collar placed underneath it, at such a distance from the breech that it cannot be clogged by the fouling residuum.

The upper part of the barrel is attached to the stock by a break-off or semi-cylindrical axis, which may be disconnected by turning a lever or catch.

The mainspring of the lock is connected with the tumbler by a linked swivel; into one end of it hooks the end of the mainspring, into the other the crane of the tumbler.

Muzzles of rifle barrels may be lined with steel inserted or welded therein.

Percussion caps may be made waterproof by making them of gutta percha or other elastic material, so as to fit the nipple tightly.

Primers, consisting of tubes made of gutta percha, contain detonating powder, may be used instead of ordinary caps.

Conical rifle bullets are made with a recess in their rear ends, into which is fitted a core or plug of horn, gutta percha, or wood, or other similar substance, or a metal ring may be inserted therein.

Wads are made by punching them from sheets of gutta percha, mixed with cork raspings.

[Printed, 8½d. See Mechanics' Magazine, vol. 57 p 276.]

A.D. 1852, March 22.—N° 14,029.

BRADY, JOHN DRUMGOOLE.—" Improvements in helmets, cartridge boxes, and other military accoutrements."

Helmets are made of four thin hollow strips of metal united at the top, and covered with felt or lined with sheet gutta percha. The strips are perforated to facilitate ventilation.

Cartridge boxes, scabbards, and sheaths are made with a foundation of gutta percha covered with felt or leather.

[Printed, 5½*d.* See Mechanics' Magazine, vol. 57, p. 277.]

A.D. 1852, March 24.—N° 14,041.

MACINTOSH, JOHN.—" Improvements in ordnance and fire-arms, and in balls and shells."

Several bullets may be charged in the same barrel one behind another, and be fired successively by one act of ignition. The bullets are made hollow in their rear end, and each contains a charge of powder. They are also perforated from end to end, and in this perforation is placed a fuse composition. The charge of the foremost bullet being ignited, it discharges the first bullet and ignites the charge of the second, which ignites the third, and others are successively ignited.

Also shells are made so that the bursting charge acts equally round the axis of the shell. A sabot of gutta percha may be used to prevent windage.

Guns may be fired from a port-hole or opening below water, by protecting the port-hole or opening with an elastic mouth or cover of vulcanized india-rubber.

[Printed, 6½*d.* See Repertory of Arts, vol. 20 (*enlarged series*), p. 354; London Journal (*Newton's*), vol. 41 (*conjoined series*), p. 408; Mechanics' Magazine, vol. 57, p. 297, and vol. 58, p. 121.]

A.D. 1852, March 31.—N° 14,052.

POOLE, MOSES.—" Improvements in fire-arms." Breech loaders. A communication.

The Specification and drawings describe breech-loading fire-arms. The breech end of the barrel is closed by a slide, which is actuated by a strong lever, forming the trigger guard, and moving up and down in an inclined slot. When drawn down, it exposes the rear end of the barrel, so that the cartridge may be inserted.

The upper edge of the slide is made to cut off the rear end of the cartridge.

The nipple and touch-hole may be inserted in the slide.

[Printed, 5½*d*. See Repertory of Arts, vol. 20 (*enlarged series*), p. 304; Mechanics' Magazine, vol. 57, p. 317.]

A.D. 1852, April 6.—N° 14,058.

GIFFARD, John Walter de Longueville.—" Improvements " in fire-arms and projectiles."

The charge is attached to the rear end of the projectile, either by a thimble or by inclosing it in a recess in the projectile. In the breech of the barrel is a projection, which breaks the paper or other covering of the charge, which is ignited by a central touch-hole in the axis of the barrel.

[Printed, 4½*d*. See Repertory of Arts, vol. 20 (*enlarged series*), p. 295; London Journal (*Newton's*), vol. 41 (*conjoined series*), p. 410; Mechanics' Magazine, vol. 57, 318.]

A.D. 1852, April 15.—N° 14,065.

DAVEY, Simon, and CHANU, Adolphe L.—" Improvements " in explosive compounds and fuses, and also in methods of firing " the same."

Explosive compounds are made by mixing—

	Parts.	
1st.	6	Chlorate of potash.
	5	Nitrate—
	2	Yellow prussiate—
	2	Bichromate—
	5	Sulphur of antimony.
2nd.	6	Chlorate of potash.
	3	Nitrate—
	4	Prussiate—
	3	Sulphuret of antimony.

Threads saturated with the above compositions are used instead of a central train of gunpowder in fuses. They are surrounded with twisted cords or strands like " Bickford's fuses." (See Patent, No. 6159, p. 78.)

The fuse may be ignited by a tube filled with an explosive compound as above described.

[*Printed*, 6½*d*, See Mechanics' Magazine, vol. 57, p. 335.]

A.D. 1852, April 17.—N° 14,066.

DELVIGNE, Henri Gustave.—" Improvements in fire-arms, " and in the methods of discharging the same, also improvements " in projectiles." Breech loaders, locks, bullets with tails.

Breech loaders are made with a barrel which is depressed on a hinge to enable the charge to be put in the breech; it is replaced and secured by a screw attached to the stock, which takes into the breech. The nipple is underneath the barrel.

A peculiar kind of lock and stock are described, and a projectile with a stem or tail behind to prevent it from being forced down upon the powder.

[Printed, 5½*d*. See Mechanics' Magazine, vol. 57. p. 336.]

A.D. 1852, April 22.—N° 14,085.

NEWTON, Alfred Vincent.—Improvements in the mode of priming fire-arms.—A communication.

The Specification and drawings describe self-priming fire-arms. The primers consist of pellets of " percussion material;" these are contained in a magazine attached to the lock, and the pellets are fed to the nipple as the cock descends.

[Printed, 5½*d*. See Mechanics' Magazine, vol. 57, p. 374.]

A.D. 1852, April 24.—N° 14,087.

CHURCH, William, GODDARD, Samuel Aspinall, and MIDDLETON, Edward.—" Improvements in fire-arms and " ordnance, and in projectiles," &c., and in machinery. Breech loaders. Rifling machinery.

The specification and drawings describe :—

First. Breech-loading fire-arms. A moveable breech is connected with the barrel, being hinged or moveable on centres, so that it is raised to admit the charge; when it is again depressed, its face is forced tightly against the rear end of the barrel by a wedge connected to the lever, which moves the breech, and working in a slot behind it.

Secondly. Ordinary smooth bore barrels are converted into rifles by inserting into them grooved or rifled tubes.

Thirdly. Breech-loading cannon are bored through: in the rear end of the cannon is cut a vertical slot, in which slides a moveable breech-piece, flat in front, and wedge-shaped behind. In the rear of this breech-piece is a wedge, which is pushed up against the breech-piece, and holds it tightly in its place. Both the breech-piece and wedge are moved by a lever so arranged that the rear wedge is withdrawn or started first, and is pushed home last. In the rear of the cartridge is placed a disc of wood accurately fitting the bore.

Fourthly. Projectiles and rockets are made with vanes or wings to give rotation. To correct windage a belt or ring of soft metal is attached thereto, behind which may be placed a ring of hard metal with a chamfered edge, to insure the expansion of the soft metal. Percussion shells are made with a rod, which on striking explodes a cap inside the shell.

Fifthly, Rifling machinery is described for rifling gun-barrels, cannon, and rocket tubes. A vertical rod, grooved to correspond to the groove required for the rifle, has an up and down motion, and passes through fixed guides, which give it the required twist. To this rod is attached the bar carrying the cutters, which may be made with four or more or less faces or cutting edges, so as to cut the requisite number of grooves. The cutters are set out by self-acting motions.

Sixthly. Self-acting machinery, for polishing, leading, and draw-boring barrels, is also described.

[Printed, 2*s.* 1½*d.* See Mechanics' Magazine, vol. 57, p. 375.]

A.D. 1852, April 29.—N° 14,095.

SIMMONS, John, LINTON, Arabin, and WALKER, Thomas.—" Improvements in the manufacture of ordnance, and in the " construction and manufacture of carriages and traversing appa- " ratus for manœuvering the same."

Wrought-iron ordnance is made by forming a faggot of segmental bars twisted round a core and welded, the layers of bars being twisted in contrary directions. The core is afterwards bored out. The trunnions are welded to a hoop or ring, which is shrunk on the piece, and a wrought-iron hoop is shrunk on in front thereof.

Carriages are made of two triangular arrangements of bars welded together, and forming cheeks which are bolted or tied together; the apex of each cheek supports a trunnion.

Traversing platforms are made with two longitudinal sides, on which the trucks of the gun-carriage work; the sides are bolted or tied by rods; they form an incline, up which the piece recoils. The platform moves round a centre pin.

[Printed, 10½*d*. See London Journal (*Newton's*), vol. 42 (*conjoined series*), p. 99; Mechanics' Magazine, vol. 57, p. 394.]

A.D. 1852, June 10.—N° 14,163.

BEASLEY, William.—Rolling machinery. Gun barrels. A strip of metal tapered and having bevilled edges is coiled round a mandril and rolled.

[Printed, 7*d*.]

A.D. 1852, July 20.—N° 14,227.

SCHLESINGER, Joseph William.—"Improvements in fire-"arms, in cartridges, and in the manufacture of powder."

Needle guns.—The needle is actuated by a bell-crank lever in combination with springs, which are acted on by inclined surfaces connected with the sliding tube. The forepart of the sliding tube fits over a continuation of the barrel. The needle is projected through a hole in a button, on the face of which is a copper washer.

Cartridges are made with the percussion powder contained in a conical case in their rear ends.

Powder is made of the following ingredients:

Chlorate of potash - - -	3 parts.
Sulphuret of antimony - -	3 „
Flower of brimstone - -	1 „

[Printed, 6½*d*. See Mechanics' Magazine, vol. 58. pp. 101 and 117.]

A.D. 1852, August 19.—N° 14,265.

HUNT, Thomas.—Improvements in fire-arms. Needle guns and safety bolt.

The specification and drawings, to which it is necessary to refer, describe, first, needle guns in which the use of a screw for retaining the sliding bolt in its place is dispensed with. The sear or lever spring retains it in its place. A revolving case covers the case of the sliding bolt entirely and excludes wet.

Double barrels are shewn with one central butt.

Apparatus for unscrewing the breeches is described.

A safety bolt is used for locking the trigger either at full or half cock.

[Printed, 9½*d*. See Repertory of Arts, vol. 21 (enlarged series), p. 172; Mechanics' Magazine, vol. 58, p. 196.]

A.D. 1852, August 23.—N° 14,271.

SHRAPNEL, Henry Needham Scrope.—"Improvements in "ordnance and fire-arms. Cartridges, and ammunition or projectiles, and the mode of making up or preparing the same." Barrels. Sights, projectiles, &c.

These relate to—

First. Barrels of fire-arms, which are made with a recess cut in them, just where the base of the projectile rests when charged, so that there may be full room for expansion.

Second. Sights are described, consisting of a leaf supported by an inclined rest, which moves on a graduated slide, so that the position and angle of the rest determines the elevation of the slide.

Third. Cylindro-spherical shot or shell are made with a rod or tail of wood or metal attached thereto, "which rod passes right "through the breech of the gun" when it is fired: it is intended to guide the shot straight and insure bursting by concussion.

Fourth. Barrels are rifled by cutting in them three "sphero-"elliptic" grooves, so that the section of the barrel resembles a circular saw with three flat-faced teeth.

Fifth. Windage is to be reduced by using a thick elastic wad and a metal plate attached to the projectile by means of a wire tail. Cartridges are made up by attaching a powder case to the wad.

[Printed, 5½*d.* See Repertory of Arts, vol. 21 (*enlarged series*), p. 226; Mechanics' Magazine, vol. 58, p. 214.]

A.D. 1852, September 10.—N° 14,289.

TAYLOR, Stephen.—"Improvements in the construction of "fire-arms and in cartridges for charging the same."

Breech loaders.—Wads.—A sliding breech is connected by an external pin with a strong lever, moved by the trigger guard. By pushing the end of the trigger guard towards the muzzle the lever draws back the sliding breech to admit of a cartridge being inserted in a loading aperture. By replacing the trigger guard the sliding piece is pushed up to the end of the barrel, and is held there by the lever, which is inclined at an angle of about 45° to the axis of the barrel. A leather wad or sole is used behind each cartridge.

[Printed, 5½*d.* See Mechanics' Magazine, vol. 58, pp. 83, 249, and 255.]

PATENT LAW AMENDMENT ACT, 1852.

1852.

A.D. 1852, October 1.—N° 1.

ADAMS, Robert.—" Improvements in ball cartridges."

A metal chamber, by preference made of thin sheet copper, is affixed to a ball and wad, and contains a charge of powder; the end of the chamber is closed with paper or other suitable material.

Note.—*Letters Patent subsequent to this date were granted under the new Law.*

[Printed, 4½*d.*]

A.D. 1852, October 1.—N° 6.

POOLE, Moses.—" Improvements in the manufacture of guns and pistols."—A communication.

Hard vulcanized india-rubber, made by mixing it with about half its weight of sulphur, and heating the compound until it becomes like horn or whalebone or ivory, may be employed instead of wood, or the other usual materials for making stocks for guns and fire-arms; or the india-rubber and sulphur may be used in a plastic state to coat stocks of fire-arms, and is subsequently heated and hardened. The india-rubber may be mixed with colouring matter or other suitable compounds.

[Printed, 2½*d.*]

A.D. 1852, October 1.—N° 30.

POOLE, Moses.—" Improvements in the manufacture of trunks cartouch and other boxes, knapsacks, pistol holsters," &c.—A communication.

India-rubber rolled into sheets and mixed with sulphur is spread upon forms or moulds in the shape of the article required to be made. The india-rubber is subsequently vulcanized and hardened by applying heat about 23° F. for the first half hour, then gradually raising the temperature for about six hours up to 295° or 305°.

[Printed, 2½*d.*]

A.D. 1852, October 1.—N° 69.

MOORE, WILLIAM, and HARRIS, WILLIAM.—" An improvement in repeating pistols and rifles."

The single barrel of revolvers is connected with the stock by a hinge joint, so that the barrel may, when required, be turned up from its place before the revolving chamber.

[Printed, 5½*d.*]

A.D. 1852, October 1.—N° 125.

HUNT, THOMAS.—" Improvements in fire-arms." Revolvers with needle locks.

The needle is attached to a slide, having an inclined under surface. The slide is actuated by means of springs, having rollers, which are pressed against the incline of the slide; or spiral springs may be used for actuating the needle.

[Printed, 7½*d.*]

A.D. 1852, October 1.—N° 131.

OMMANNEY, HENRY MORTLOCK.—" An improvement in the manufacture of guns, cannon, and ordnance."

The ordnance is cast in iron, and is then placed in an annealing furnace, and continued there until the metal becomes decarbonized, so as to be rendered partially malleable.

[Printed, 2½*d.* See Register of Arts and Sciences, vol. 3, p. 237; Stuart's Anecdotes of Steam Engines, vol. 1, p. 41.]

A.D. 1852, October 2.—N° 171.

LEWIS, WILLIAM JAMES.—" A slideless stadia sight, applicable to rifles and other fire-arms."

The stadia sight is fixed on the barrel at a distance of 12½ inches from the eye. Suppose the object aimed at be an infantry soldier, measuring, with shako, six feet in height, the eye, looking through a hole in the sight a quarter of an inch high, would embrace his entire height at 100 yards,—

At 200 yards the hole or opening should be $\frac{1}{8}$ inch high.
,, 300 ,, ,, $\frac{1}{21}$,,
,, 600 ,, ,, $\frac{1}{24}$,,
,, 800 ,, ,, $\frac{1}{32}$,,

By making in the stadia sight slits or openings of these various heights, or others for intermediate distances, the eye would judge which opening was filled by the object, and so calculate his distance and arrange the sight at the corresponding marked elevation. For aiming at cavalry, the opening must be calculated for 9 feet.

[Printed, 7½*d.*]

A.D. 1852, October 2.—N° 184.

NEEDHAM, JOSEPH.—" Improvements in breech-loading fire-" arms, and in apparatus connected therewith."

The Specification and drawings describe a breech-loading needle gun. The needle-slide or tube hinged to the breech of the laurel, the top part of which is cut away. The needle is actuated by a helical spring contained in the tube. The front of the tube is screwed, and upon it is a screwed cap, moved by a lever, by which the front of the cap is engaged in the barrel or drawn back from it, to admit the cartridge. The cartridge is made to ignite by piercing its fulminating composition with the needle. It is constructed with a base, forming a capsule or ring of expanding soft metal or other suitable substance, which is expanded by the explosion, and so forms a tight joint; the base or capsule or ring is subsequently drawn out from the barrel by means of a tail attached thereto. Other improved details connected with the lock are described.

[Printed, 7½*d.*]

A.D. 1852, October 5.—N° 219.

BURR, ARTHUR RICHARD.—" Improvements in making gun " and pistol barrels," &c.

The Specification and drawings describe machinery for coiling rods of iron or other metal for making twisted barrels. Also swage tools fixed in the ends of a lever, which receive rapid motion by the action of an eccentric. The barrels may be hammered by a tilt-hammer in "angle-shaped grooves." Rods or bars, whose sectional form is rhomboidal, may be used for making twisted barrels; or very narrow rods may be coiled on a hollow tube, and the whole be welded together to form a barrel.

[Printed, 5½*d.*]

A.D. 1852, October 11.—N° 329.

BELLFORD, AUGUSTE EDOUARD LORADOUX.—" Improve-" ments in the construction of revolving or repeating fire-arms.' —A communication.

The Specifications and drawings describe a single-barrel revolver. The breech-piece has a backward and forward as well as rotatory motion on its axis, and is wedged in its place by a sliding piece "or crotch," which is moved up and down by a lever guard, whose lever motion turns the breech-piece and cocks the lock. In the front face of the breech-piece, round each chamber, is a circular recess, in which the bevelled edge of the barrel is engaged by the breech-piece being pushed forward, when the piece is ready to be discharged.

[Printed, 10½*d.*]

A.D. 1852, October 19.—N° 436.

MOLE, Robert, and Robert MOLE, Junior.—"Improvements in the manufacture of swords and matchets."

The tang is formed out of the end of the steel blade by cutting it in a pair of dies, and is tapered by "back rolling," with rolls having part of their periphery cut away. The furrows are formed by dies or cutting tools, and are cleaned by using a metal wheel as copper and emery powder.

A machine is described for cutting wooden handles and drilling holes therein.

The raised rib formed near the end of a sword is made by hammering with the tilt-hammer.

[Printed, 3½*d.*]

A.D. 1852, October 30.—N° 583.

BROOMAN, Richard Archibald.—"Improvements in revolving fire-arms."—A communication.

The Specification and drawings, which should be referred to, describe a revolver in which the charging chambers are formed in a disc, which revolves on an axis fixed in the lock-plate in a horizontal position and at right angles to the axis of the barrel. Self-loading apparatus is attached to the piece.

[Printed, 9½*d.*]

A.D. 1852, November 3.—N° 633.

MACKINTOSH, John.—"Improvements in projectiles and "cartridges."

The end of the projectile is covered with paper prepared by impregnating it with meal powder. In the paper is placed the entire or a part of the charge, part of which may be in a recess in the projectile. The flash from a cap will ignite the paper and charge.

To give rotation to the projectile, it is made hollow, with inclined or screw-shaped projections within.

[Printed, 4½*d.*]

A.D. 1852, November 4.—N° 635.

PRYSE, CHARLES, and REDMAN, RICHARD.—" Improvements " in a certain description of fire-arms." " Saloon" fire-arms.

A bolt and spring are applied to the cock or hammer, which has a longitudinal slit in it. The bolt prevents the hammer from being blown back by the explosion, as it will resist all direct action in a line with the axis of the barrel; by the act of cocking the hammer is relieved from the direct pressure of the bolt.

[Printed, 5½*d.*]

A.D. 1852, November 11.—N° 712.

SHARPS, CHRISTIAN.—" Improvements in breech-loading fire- " arms."

The Specification refers to a former Patent granted to Moses Poole, dated March 31, 1852 (See Patent N° 14,052, p. 121). It describes a breech-loading gun, having a moveable breech-piece, which slides in an opening in the rear of the barrel, and is connected by a link with the trigger-guard, which acts as a lever. A ring or facing of platina is let into the breech-piece to resist the destructive effects of the explosion.

The rear end of the barrel is enlarged, to admit of the insertion of an adjustable flush, which receives the charge, and is pressed up against the face of the breech-piece, and makes a tight joint.

[Printed, 5½*d.*]

A.D. 1852, November 23.—N° 824.

WINTER, JOHN.—" Improvements, &c., in the manufacture of " axles, &c., cannon, and other articles."

Segmental bars are rolled of such a sectional form that they dovetail or fit one within the other. The bars are put together in concentric layers, so as to form a cylinder, and are heated and welded together. The core is afterwards bored out.

[Printed, 6½*d.*]

A.D. 1852, December 2.—N° 936.

NORTON, John.—"Improvements in shot or projectiles."

The projectiles have a hollow or recess in their rear end, filled, first, with fulminating powder; secondly, with gunpowder in about equal quantities, the two being separated by thin paper. The charge is covered with a disc of thin greased or waxed linen, or other suitable material. The charge may be wholly of gunpowder. Malleable cast-iron shot with projecting ribs are used for rifled cannon.

[Printed, 5½*d.*]

A.D. 1852, December 4.—N° 960.

BENTLEY, Joseph.—"Improvements applicable to fire-arms." Single barrel revolvers.

A bolt or catch is attached to the hammer, which withholds it from the nipples during the act of loading.

The breech is turned, and the lock cocked and discharged by the single action of pulling the trigger. The top of the trigger is rounded, and a catch is fixed on the end of the trigger-spring, which holds the breech fast when the piece is fired.

Gutta percha or papier mâché may be used for forming the side plates of the stock.

A sight and graduated slide are shown attached to the barrel.

[Printed, 8½*d.*]

A.D. 1852, December 7.—N° 988.

GODDARD, Samuel Aspinwall.—"Improvements in con-" struction of pistols." Revolvers.—(Provisional Protection only.)

The invention relates to repeating fire-arms which have a single barrel and a revolving breech-piece, or a barrel with as many bores as there are chambers in the breech-piece.

[Printed, 2½*d.*]

A.D. 1852, December 8.—N° 1000.

LAWRENCE, James.—"Improvements in the manufacture of" projectiles." Combination of soft with hard metal.

Projectiles are cast of two or more metals combined, one being hard for striking an object, the other soft, so that it may be made to expand and fit the bore of the barrel; the metals are connected by casting one upon the other. Zinc and lead, in proportions of 9 parts zinc and 12 parts lead, may be advantageously employed.

[Printed, 2½d.]

A.D. 1852, December 17.—N° 1094.

KRUPP, Alfred.—" Improvements in cannons." Steel cannon.

Pieces of ordnance are made of steel cast in the form of a solid block, which is hammered and turned and bored; or they may be made of cast steel, and surrounded with a casing of cast iron or gun metal " extending about to the end of the second reinforce." The casing does not fit close to the gun in the middle part, but a space is left there to allow of the expansion of the chamber during the explosion.

The casing is attached to the gun by means of a screw cut on the cascable.

[Printed, 8½*d.*]

1853.

A.D. 1853, January 7.—N° 47.

LANCASTER, Charles William.—" An appendage to bullet " moulds."

A cup-shaped hollow cutter is applied to the mould; it has an eccentric orifice near the bottom of the recess in the bullet, through which the lead is poured into the mould, and the edges of the orifice cut off the superfluous lead.

[Printed, 4½*d.*]

A.D. 1853, January 8.—N° 55.

ABRAHAM, John.—" A new or improved method of manu- " facturing percussion caps."

The blanks for forming the caps are cut out of the sheet in a zigzag form, each blank fitting accurately into those next to it, as shown in the drawings.

By these means all scrap and waste may be avoided.

[Printed, 7½*d.*]

A.D. 1853, January 10.—N° 66.

STIRLING, John Davies Morries.—" Improvements in the " manufacture of percussion caps."

These consist in the employment of zinc " covered or plated " with tin," or " ductile alloys of tin and zinc," or silver instead of copper, in manufacturing caps.

[Printed, 2½*d.*]

A.D. 1853, January 12.—Nº 82.

ARROWSMITH, JOHN.—" New or improved machinery for " shaping metals." Gun-barrels.

The Specification and drawings describe two circular plates or discs, which are made to revolve in contact, so as to roll or shape " taper articles, as axletrees, gun-barrels," &c.

[Printed, 8½*d.*]

A.D. 1853, January 12.—Nº 86.

HASLEWOOD, EDWARD.— Improvements in fire-arms and projectiles. Revolvers. —A communication.

The circular breech-piece, containing the chambers, revolves horizontally. The chambers are bell-mouthed, and the outer end of each is formed with two steps or enlargements. One is forced upon the bevelled edge of the barrel during discharge, the other receives a ring which is cast upon the projectile. The ring being thus held, is left behind when the projectile is fired.

When the chambers are all charged, the disc or breech-piece is put into a hoop, and the bullets are forced in by the action of pressing the hoop tightly on the breech-piece.

[Printed, 9½*d.*]

A.D. 1853, January 19.—Nº 131.

COOPER, JOSEPH ROCK. — " Improvements in fire-arms." Breech-loaders.

The moveable breech has a sliding motion, and is raised into an " angular position " to receive the charge by a lever. The lever acts behind the moveable breech, at right angles to its axis. One of its sides is inclined, and when the charge is inserted, and the moveable breech is turned down, it is forced up against the end of the barrel by this inclined surface.

[Printed, 6½*d.*]

A.D. 1853, January 28.—Nº 212.

TRANTER, WILLIAM.—" Certain improvements in fire-arms." Revolvers and breech-loaders.

These relate to, 1st, revolving pistols, which have two triggers, or a double trigger, one to cock and the other to discharge the piece, combined with a safety bolt. The socket of the revolving breech is elongated and screwed so as to keep the breech-piece close to the barrel. 2nd. Breech-loading fire-arms are made with double-acting triggers.

The breech-piece is moveable round a horizontal pin, so that when it is pushed down on one side the charging chamber is exposed. It is fastened in its place, when charged, by a screw and bolt acting behind it. The piece may be fired by a cap or by a needle.

Gun-barrels are made by twisting two wires spirally, so as to cross and become interwoven; in this form they are welded together.

[Printed, 11½*d.*]

A.D. 1853, February 4.—N° 305.

WEBLEY, Philip.—Improvements in repeating-pistols and other fire-arms.

The single barrel is attached to the lock frame by a hinge, so that it may be bent downwards in a plane parallel to the axis of the revolving breech-piece, to enable the latter to be removed.

The sear of the lock is attached to the hammer by a hinge joint, instead of being connected with the trigger.

[Printed, 5½*d.*]

A.D. 1853, February 4.—N° 306.

WINIWARTER, George.—"Improvements in the application "of explosive compounds."

Three compositions are described, consisting of,—

No. 1.	300	parts	fulm. mercury.
	288	,,	chlor. potass.
	312	,,	sulph. antim.
	60	,,	charcoal and nitre, in proportion, 16·7 ch., 65·3 nitre.
	23	,,	ferrocy. potass.
	6	,,	binox. lead.
	900	,,	etheroxylin (being 75 hyroxylin to 150 sulphuric ether).
No. 2.	75	,,	fulm. zinc.
	4	,,	chlor. potass.
	7	,,	sulph. antim.
	15	,,	binox. lead.
	1	,,	ferrocy. potass.
	224	,,	etheroxylin.

No. 3. 75 parts amorphous phosphorus.
64 „ binox. lead.
15 „ char. and nitre mixed.
106 „ etheroxylin.

The ingredients are to be mixed as described in the Specification of a former Patent. (See N° 13,935, p. 118.)

The composition is charged in a recess in the rear of the shell or projectile used, which may be formed of two parts and screwed together.

It is also used for making gun-matches or primers, being fixed on paper prepared with concentrated nitric acid.

[Printed, 5½*d.*]

A.D. 1853, February 5.—N° 319.

WOLLOWICZ, Antoine.—Improvements in primers for fire-arms.

The primers or percussion caps are fixed in a row in holes in leather or india-rubber strips, so that they may be easily handled, instead of being taken out of a pouch one by one.

[Printed, 4½*d.*]

A.D. 1853, February 12.—N° 371.

WINIWARTER, George.—"Improvements in fire-arms." Needle breech-loader.

The Specification and drawings describe fire-arms in which the barrel turns down to admit the charge. In order to ensure a perfectly tight joint, india-rubber rings are placed between the end of the barrel and the moveable breech.

The needle is greased by oil supplied from a self-acting reservoir.

[Printed, 10½*d.*]

A.D. 1853, February 22.—N° 452.

WINIWARTER, George.—Improvements in the manufacture of fire-arms.

These consist in making the stocks of sheet iron, which may be covered with gutta-percha or board made of straw pulp, or other suitable moulded material may be similarly used.

[Printed, 2½*d.*]

A.D. 1853, March 3.—N° 535.

COLT, SAMUEL.—" Improvements in rotating breech fire-arms." Revolvers.

These relate to a mode of causing the breech-piece to revolve. In the periphery of the breech-piece are cut long and short straight grooves connected by curved diverging grooves. In these a pin is made to traverse; the pin is carried by a sliding block working in guides, and is connected by a strap or link to the hammer, the movement of which causes the pin to traverse, and as it moves in the curved grooves produces rotatory motion. The Drawings should be referred to.

[Printed, 5½*d.*]

A.D. 1853, March 3.—N° 538.

COLT, SAMUEL.—" Improvements in rotating breech fire-arms." Revolvers.

These consist, 1st, in forming the rotating chamber breech-piece with a hole made at the rear end extending only partly through it; it revolves on an axis or arbor. In the front face of the breech-piece are the chambers, and as there is no communication with the arbor in front it cannot be fouled.

2nd. In order to adjust the breech-piece as closely as may be required to the barrel, a screwed collar is fitted into the bore of the recoil shield, in which the axis or arbor is received, and by turning the collar the breech-piece is adjusted.

3rd. Improvements on a former Patent of June 20, 1849 (see N° 12,668, p. 109), are described, relating to the lever ramrod, which is worked by a segment rack.

4th. The barrel is connected with the lock frame by a hinge, to enable it to be turned down so that the breech-piece may be removed. The barrel is drawn into close contact with the lock-frame by means of an abutting piece fixed to it, whose pin takes into a groove formed in a button carried by a pin on the lock-frame.

[Printed, 5½*d.*]

A.D. 1853, March 3.—N° 540.

NEWTON, WILLIAM EDWARD.—" Improvements in primers " for fire-arms."—A communication.

Suitable detonating preparations are inserted in shallow indentations made round the edge of a disc of metal or other suitable material. The preparations are covered with varnish or other substance. The disc may be turned by a wheel, and each primer successively placed on the nipple and exploded.

[Printed, 4½*d.*]

A.D. 1853, March 5.—N° 555.

GEDGE, JOHN. "Improvements in the construction of fire-arms, "and in the means of loading the same."—A communication. Breech-loaders.

A plunger is moved in a slotted tubular chamber in the rear of the barrel by a lever connected with the trigger-guard. The lever is set at such an angle to the plunger that the latter cannot recoil during the explosion. Grooves are cut on the periphery of the plunger to allow of the escape of the gases. The lock works are covered with a protecting plate before being fitted into the gunstock.

[Printed, 7½*d.*]

A.D. 1853, March 7.—N° 577.

HALL, JOHN.—"Improvements in revolving or repeating fire-"arms."

A Complete Specification was filed with the petition; it describes a revolver with several barrels, which are turned by hand as each is discharged. Upon the breech end of the barrels is a projecting ring or flange with notches cut in it, in which a spring catch engages, so that the barrels are held in the right position during the discharge.

[Printed, 4½*d.*]

A.D. 1853, March 8.—N° 591.

MACCARTHY, JOHN JAMES ALEXANDER.—"Improvements "in gunnery and projectiles (with pouch for the latter)," &c. Breech-loading needle-gun. Cannon.

A breech-loading musket is made with a tubular chamber in the rear of the barrel, the aperture being covered by a slide or shield moved by hand along the barrel; a needle is used for discharging the piece. The bayonet is permanently attached to the musket, and has a sliding motion on the barrel. The pouch used has a lid or flap, which opens on a hinge sideways, instead of from the front backwards. Breech-loading cannon are made with a moveable breech-piece turning down upon a hinge; the breech-piece is to be held in its place by a strong pin. In order to lessen and break the motion of the recoil, the gun carriage is attached to springs attached to a fixed bearing, as a ship's deck.

Cartridges for needle-guns are made with a recess in their rear end to fit on a nipple or guide, so that the action of the needle may be direct.

[Printed, 10½*d.*]

A.D. 1853, March 9.—N° 594.

BLACKWELL, Samuel.—An improved strap or band, &c. Military belts. Harness, &c.

Military belts, straps, and saddle girths are made partly of vulcanized india-rubber or other elastic material, to allow of their yielding sufficiently to permit easy respiration.

[Printed, 8½*d.*]

A.D. 1853, March 12.—N° 620.

GILBY, John.—" Improvements in fire-arms." Breech-loaders.

The breech-piece turns on centres or pins, and fits accurately in a metal case attached to the stock. It is thrown up by a spring with a roller fixed underneath, and when fixed, is held fast down by a pin passing through a loop on its under side. The ends of the breech-piece and of the barrel are chamfered, and a groove is cut round them in the inner circumference of the breech case, to intercept fouling deposits; there is also a slit in the bottom of the breech case to allow of their escape. Self-acting priming apparatus is used for placing a cap on the nipple every time that the breech-piece is thrown up to admit the charge.

[Printed, 1*s.* 6½*d.*]

A.D. 1853, March 12.—N° 628.

HUNT, Thomas.—" Improvements in the construction of sights " for fire-arms."

The sight is mounted on a ball and socket, and is moved laterally by a screw. The scale is engraved on a moveable and adjustable surface, so that each gun may be sighted according to its shooting.

[Printed, 6½*d.*]

A.D. 1853, March 16.—N° 653.

FANSHAWE, Henry Richardson.—"Improvements in fire-arms." Ignition by electricity.

The electric or galvanic fluid is passed through an insulated needle, which is actuated by a spring, and made to penetrate the cartridge or charge.

The breech is connected with one pole, and the needle with the other pole of a battery attached in any convenient manner to the gun or cannon; the charge is thereby ignited.

[Printed, 10½*d.*]

A.D. 1853, March 29.—N° 743.

WEBLEY, James.—"Improvements in the construction of repeating or revolving and other pistols and fire-arms."

These relate, first, to improvements in the lock for engaging and disengaging the trigger from the cock when the lock is self-cocking, and for half-cocking where the lock is cocked by hand; also to a mode of connecting the barrel by a hinge to the lock-plate. The axle on which the breech-piece turns may be made square or angular in section in its middle part so as to arrest any fouling deposits.

[Printed, 7½*d.*]

A.D. 1853, April 18.—N° 940.

HALE, William.—"New kinds of fire-arms" for firing rockets.

The Specification and drawings describe tubes connected with a stock in which a lock is fitted, for firing rockets without sticks from the shoulder or from the hand. The rockets are such as are described in the Specification of a former Patent of William Hale (see Patent, N° 10,008, p. 97), being made to rotate on their axis by means of the fire escaping from tangential holes in the rocket case.

Instead of tubes, wires hooped together, so as to form open cases, may be employed. They may be beaten to the shape of an **S**, so that no injury may be caused by the back fire to the person firing them.

[Printed, 9½*d.*]

A.D. 1853, April 21.—N° 960.

REEVES, CHARLES.—"Improvements in swords."

These consist in forming the tang of the sword of the same width, or nearly so, as the blade. To this broad tang the handle is attached in any convenient way, so that the hilt and blade are firmly connected together.

[Printed, 4½*d.*]

A.D. 1853, April 21.—N° 964.

HARRIS, PHILIP. — "Improvements in fire-arms." Circular trigger.

A circular-shaped wedge or plate is attached to the trigger, which acts on the rear.

The periphery is made of such a curvilinear shape that the action of the trigger, instead of being a jerk, is prolonged, and the power exerted on the rear is rendered uniform throughout its range of action. Full directions are given for shaping the periphery with mathematical precision.

[Printed, 7½*d.*]

A.D. 1853, April 26.—N° 996.

SHEATH, ISAAC BRENTNALL.—"Improvements in fire-arms." Revolvers.

The barrel, which has a strong projecting shoulder below, is connected with the solid frame of the stock by two screws, one fixed on the end of the axle on which the breech-piece turns, which screws into the projecting shoulder, the other a moveable thumb-screw passing through corresponding female screws in the lower part of the shoulder and in the lock-frame. A spring lever is attached to the trigger, by the upper part of which the chamber is made to revolve, at the same time that a projection on the lower part stops and retains the chamber-piece in the required position when the piece is to be discharged.

[Printed, 5½*d.*]

A.D. 1853, April 26.—N° 1000.

HADDAN, JOHN COOPE.—"Improvements in the manufacture "of cartridges and of wads," &c.—(Provisional Protection only.)

The Provisional Specification describes cartridges which are made thin in the part where they are required to break to let out the powder, so that the cartridge is easily broken at that part by pressure.

Wads are made of rings or annular pellets having different internal diameters, formed of pelt or paper or other suitable material; or the wads are made of an annular and concave shape, by pressing paper pulp or other material in mould.

[Printed, 2½*d.*]

A.D. 1853, April 28.—N° 1033.

SITWELL, William Hurt.—" Improvements in projectiles for " cannon and fire-arms."

The projectiles are cylindro-conoidal in shape, and have a tubular passage through them, which may be in the form of a screw, or have part of a screw thread introduced.

The tubular passage is said to prevent a vacuum being formed in the rear of the projectile and to increase the range, the screw giving rotation and producing the effect of rifling.

[Printed, 7½*d.*]

A.D. 1853, April 29.—N° 1038.

PENNELL, Thomas.—" Improvements in the construction of " revolving or repeating fire-arms," &c.—(Provisional Protection only.)

The invention consists, first, in a mode of casing the hammer and lock; secondly, in a mode of connecting the barrel with the lock-frame, as shown in the drawings; thirdly, in the use of a lever ramrod.

[Printed, 4½*d.*]

A.D. 1853, May 6.—N° 1123.

RIERA, Mariano.—" Improvements in fire-arms." System of ignition and breech-loading.

The Specification and drawings describe, first, breech-loading small arms. A cartridge in the form of an acorn is used, at the pointed end of which is the powder and fulminating priming, which is allowed to project into an opening in the breech end of the barrel, in which works a spring hammer in a plane at right angles to the axis of the barrel. The barrel is moved away from the breech on a slide working in a groove in the barrel, by a lever underneath to admit the charge. When moved back the barrel is fastened by a catch. The end of the breech projects into the barrel, and may be made of copper or other expanding metal, so as to ensure a tight joint. Various kinds of cartridges are described. The same principle of ignition is applied to large pieces and cannon.

[Printed, 1*s*. 1½*d*.]

A.D. 1853, May 14.—N° 1203.

BRADY, John Drumgoole.—"Improvements in knapsacks."

The knapsacks are made of gutta percha or other suitable material moulded into the required shape, as shown in the drawings, with the straps attached. They are covered with waterproof cloth.

[Printed, 5½*d*.]

A.D. 1853, May 16.—N° 1211.

PHILLIPS, Moreton Hassall.—"An improved gun." Application of vulcanized india-rubber.

The elastic retractile power of tubes or strips of vulcanized india-rubber, or other similar material, is applied to propel projectiles from a suitably shaped tube.

[Printed, 7½*d*.]

A.D. 1853, May 25.—N° 1277.

CHURCH, WILLIAM.—"A new or improved sight for cannons " or other ordnance."—(Provisional Protection only.)

The sight is formed of a graduated rod, with an angular depression at the top; it is made to slide in a cylindrical hole in the breech, and is fixed by a set screw or spring.

[Printed, 4½*d*.]

A.D. 1853, May 26.—N° 1298.

HARVEY, William James.—"Improvements in fire-arms." Revolvers.

The Specification and drawings describe a revolver with a single barrel. The hammer or discharging ram acts in a line parallel to the axis of the barrel, and is, with the lock, enclosed in a case. The barrel has a guard which covers the revolving breech.

[Printed, 5½*d*.]

A.D. 1853, May 28.—N° 1320.

MARSTON, William Walker.—"Improvements in breech-"loading fire-arms, and in cartridges," &c.—(Provisional Protection only.)

The apparatus for loading at the breech consists of a sliding breech with a conical face fitting into the rear of the barrel, which is moved by a lever up to or from the barrel. The sliding breech is connected with the lever by a suitable link.

The cartridge to be employed has a wooden or other wad in the rear, which is left behind by the explosion, and is driven out by the succeeding charge.

[Printed, 2½*d.*]

A.D. 1853, May 30.—N° 1332.

BROOMAN, Richard Archibald.—"Improvements in fire-"arms." Self-loading fire-arms.—A communication.

The Specification and Drawings, which should be referred to, describe a self-loading gun in which the charges are contained in tubes in the stock. The gun is charged and primed by self-acting apparatus.

[Printed, 1*s.* 1½*d.*]

A.D. 1853, June 4.—N° 1376.

KERR, John James.—"Improvements in the manufacture of "cartridges."

The Complete Specification, filed with the petition, describes cartridges made of tin metal cases, coated with flock or fibre.

[Printed, 2½*d.*]

A.D. 1853, June 6.—N° 1390.

LOTT, Frederick.—"Improvements in cartridges."—(Provisional Protection only.)

The cartridge is to be made of paper or other material weaker in the more forward part than at the back, so that it may break and let out the powder when it is rammed down.

[Printed, 2½*d.*]

A.D. 1853, June 8.—N° 1404.

HORROCKS, John, and HORROCKS, James Dunlop.—"Improvements in the manufacture of detonating or percussion "caps." Waterproof caps.

The caps are made of thin metal, and are lined with an elastic waterproof material, such as gutta percha. The gutta percha is introduced into the caps in a heated state, and by means of a suitable presser piston is made to coat the interior thereof.

In place of metal, woven fibrous material, as calico, may be used to form the outside case.

[Printed, 2½*d.*]

A.D. 1853, June 13.—N° 1428.

SMITH, William.—"Improvements in the mode of manufac"turing metallic handles for knives," swords, &c.

The handles may be made of white metal or other metal, and are cast upon the tang, instead of being attached thereto by cement or by other ordinary means.

[Printed, 3½*d.*]

A.D. 1853, June 15.—N° 1447.

REEVES, Charles Evans.—"Improvements of guns and other "fire-arms," &c., and "in balls, cartridges, and explosive com"pounds." Breech-loaders, &c.—(Provisional Protection only.)

Breech-loading guns may be made with two tubes, the external one revolving on the internal one, which is attached to the barrel; each tube has an opening to admit the charge, the openings being closed by turning the external tube round. The projectiles are made with a recess in their rear to contain the propelling charge.

[Printed, 2½*d.*]

A.D. 1853, June 20.—N° 1499.

CRICKMAY, Charles.—"Improvements in the construction of "fire-arms." Breech-loaders.

The breech is made moveable, and turns upwards on a hinge or centres to admit the charge into the chamber made in it. The nipple and hammer are underneath the gun. The barrel is made to slide in the stock, and when it is pushed up to the breech-piece, a shoulder on the latter is engaged in the rear end of the barrel by means of suitable projections on the breech, these take into grooves in the barrel, and are fastened by turning the barrel through one-eighth of its circumference. The charge may be ignited by means of a percussion tube projecting from the rear end of the cartridge.

In the stock may be formed chambers, with springs in their bottoms, to receive spare cartridges.

[Printed, 10½*d.*]

A.D. 1853, July 9.—N° 1634.

PARKES, James, and PARKES, Samuel Hickling.—" Im-" provements in the manufacture of certain drawing or mathe-" matical instruments," &c., and in packing or fitting them and other articles, such as fire-arms.

The drawing instruments are made of rolled or stamped metal, instead of cast metal. The cases for instruments or fire-arms are made by casting metal or plaster of Paris into suitably shaped blocks, and covering them with flock or other fibrous substance dusted upon glue or other adhesive material.

[Printed, 7½*d.*]

A.D. 1853, August 11.—N° 1870.

BRAND, Richard Farmer.—" Certain improvements in fire-" arms and ordnance." Breech-loaders.

An enlarged cylindrical chamber is made in the rear of the barrel; it has a slot on one side, in which fits a straight bar, connected by a hinge to a conical plug, which slides in the chamber and closes the rear of the barrel. When the straight bar is pulled out sideways, the conical plug slides back and opens the rear of the barrel to admit the charge. The plug is then again pushed up to a shoulder in the rear of the barrel, and its face closes the bore. Its straight piece or bar is shut down in the slot, and abuts against the solid end of the chamber. A ring is attached to the bar for the purpose of pulling it out; it is also turned over the end of the barrel, and fastens the sliding piece in its place. A cutter is fixed in the bore, near the touch-hole, and breaks open the cartridge as it is pushed in.

[Printed, 8½*d.*]

A.D. 1853, August 12.—N° 1881.

TURNER, THOMAS, and SWINBURN, JOHN FIELD.—" Im-" provements in sights for rifles."

The block or foot of the sight is made solid, and the leaf is formed with a spring, " which, by passing into a groove or grooves " on the upper part of the block," retains the leaf in its required position, but allows it to be pressed backwards or forwards over the surface of the block.

[Printed, 4½*d.*]

A.D. 1853, August 13.—N° 1900.

GWYNNE, JOHN.—" Improvements in the preparation of a " black powder from coal," &c. Gunpowder.

These consist in a method of preparing dust made by pulverising the patentee's solidified peat or coal, so that it may be used as a pigment, and also instead of charcoal in the manufacture of gunpowder.

[Printed, 3¼*d.*]

A.D. 1853, August 24.—N° 1966.

BELLFORD, AUGUSTE EDOUARD LORADOUX.—" Improve-" ments in fire-arms." Breech-loaders.—A communication.—(Provisional Protection only.)

The Provisional Specification and drawings described a revolving primer, consisting of a drum carrying a series of nipples, each of which is made to communicate with the charge, and is fixed in succession. The piece is loaded at the breech by means of a hinged breech, that slides backwards as described.

[Printed, 6½*d.*]

A.D. 1853, August 27.—N° 1988.

LANCASTER, CHARLES WILLIAM.—" A method of and ma-" chinery for manufacturing or producing certain descriptions of " gun and pistol barrels." Rifles with oval bores.

The Specification and drawings describe machinery for rolling a gun-barrel, which has been bored with a circular bore, and " forming it into a barrel, the interior of which shall be spirally " elliptical," by the rolling and twisting motion acting simultaneously. The object may be effected by employing " a pair of

" grooved rolls, the upper one of which is kept in contact with the " lower by means of weighted levers," which are adjusted to impart pressure as required. At the back of the rolls is a rod, having at its end next to the rolls a pair of fingers, which grasp firmly the barrel as it issues from the rolls, and by suitable machinery is made to pull, and at the same time twist the barrel into the required shape. The barrel to be flattened is passed over a short mandrel, whose diameter equals the minor axis of the ellipse to be produced.

Or instead of using a gripping and twisting instrument the rolls may be grooved spirally, and the ends of the rolls may be curve-shaped to correspond with the curve of the groove. Friction rollers are placed at the end of the rolls, to "cause them to be " shifted endways, as their revolution brings round their curved " grooves to act on the barrel." By giving the rollers this compound motion barrels, either in a heated or a cold state, are made of an elliptical section with the required twist.

[Printed 1*s.* 6½*d.*]

A.D. 1853, September 5.—N° 2046.

NEWTON, William Edward.—" Improvements in breech-" loading guns."—A communication.

The breech of the gun is connected with the barrel by an exterior male screw cut on the former, and an interior female screw cut in the latter. Portions of both screws are cut away, so that the breech screw may be pushed in and engaged by a small turn, as one-sixth, in the threads of the female screw. Suitable apparatus is described for effecting this purpose by the motion of a single lever worked by hand.

[Printed, 5½*d.*]

A.D. 1853, September 14.—N° 2127.

WEBLEY, Philip.—" Improvements in repeating pistols and " other fire-arms."

"The driver by which the rotation of the barrels is effected is " made of one piece with the stop," to effect the requisite steadiness and precision of position during the discharge. The outer end of each charge chamber is dished or enlarged so as to fit closely upon the conical end of the fixed barrel during the discharge, or while the hammer is on the nipple; it is disengaged therefrom when the hammer is raised.

The improvements are based upon those described in the Specification of a former Patent, dated February 4, A.D. 1853. (See N° 335, p. 135.)

[Printed, 5¾*d.*]

A.D. 1853, September 20.—N° 2176.

FLETCHER, Robert, and SMITH, John.—"Improvements in "fire-arms, and discharging the same." Breech-loaders and priming percussion tube.—(Provisional Protection only.)

The barrel of the gun slides in the stock, and is connected with it by a locking motion like a bayonet.

The cartridge has a tube attached to it filled with percussion powder.

[Printed, 2¼*d.*]

A.D. 1853, September 20.—N° 2184.

NEEDHAM, Henry.—"Improvements in revolving fire-arms."

To prevent the aim from being disturbed by the force usually required to pull the trigger and turn the breech-piece, it is proposed to make the tumbler in the lock with a notch or bent, and to form "in the lifter which fits into the ratchet on the back of the breech "another notch or bent," and also to form "the inner end of the "trigger with two projections or noses." By this arrangement "the barrels are caused to revolve by pulling up the cock."

To prevent the breech from sticking a tube is placed "on the "under part of the barrel which fits into the centre of the breech "and round which it revolves."

[Printed, 4½*d.*]

A.D. 1853, September 23.—N° 2197.

LEETCH, James.—"An improved method of constructing breech-"loading fire-arms."

The breech-piece or charge chamber is hinged to the under side of the barrel, and turns on an axis parallel to its bore; it fits into an aperture made in the breech end of the barrel.

The breech-piece is moved sideways by hand, and is fixed, when in its place, by a locking bolt, actuated by the cock, and withdrawn by it when at half cock or full cock.

[Printed, 7¾*d.*]]

A.D. 1853, October 4.—N° 2264.

NORTON, John.—" Improvements in firing explosive com" pounds."—(Provisional Protection only.)

The explosive compound is proposed to be connected with the ends of two loose cords. By pulling these asunder near the touch-hole or near the charge to be fired, the friction causes the compound to explode and ignite the charge.

[Printed, 2½*d.*]

A.D. 1853, October 8.—N° 2313.

NEWTON, William Edward.—" Improvements in fire-arms " and cartridges." Breech-loaders and self-primers.—A communication.

The breech is moveable and either turns on journals or on a socket joint; it is moved by a lever forming the trigger guard. A tubular receptacle is formed in the stock to receive caps, which are pushed forward by a spring. When the mouth of the breech-piece is raised to admit the charge, the nipple is brought opposite to the mouth of the cap tube, and a cap is placed on the nipple. A hollow punch, communicating with the nipple and touch-hole projects into the powder chamber, the cartridge is broken on the punch, and fire from the cap is flashed through it. Round the face of the breech-piece, and if requisite the rear end of the barrel, a groove is cut to allow the fouling to escape.

Cartridges are made with a cup of paper to receive the powder, and an envelope of linen, which encloses the powder and ball.

[Printed, 11½*d.*]

A.D. 1853, October 12.—N° 2351.

JONES, Richard, and JONES, Charles John.—" Improve" ments in fire-arms." Series of barrels.

The barrels are arranged one above another in a stock in such a manner that their nipples are placed in a curve. The hammer is mounted on an arm connected to both ends of the mainspring, and is made to strike each nipple in succession as required.

[Printed, 5½*d.*]

A.D. 1853, October 19.—N° 2409.

NORTON, John.—" Improvements in fire-arms." Rifled fire-arms cast with grooves.

Instead of boring and rifling cannon subsequently to their being cast, they are cast with grooves in moulds in which the grooves are formed by ribs or projecting pieces. Malleable cast iron is to be used for the shot; those described in the Specification of a former Patent, dated December 2, A.D. 1852 (see N° 936, p. 132), are preferred.

[Printed, 5½*d.*]

A.D. 1853, October 25.—N° 2459.

BRADY, John Drumgoole.—" An appendage to knapsacks."

A pouch, capable of containing about 20 rounds of ammunition, is attached below the knapsack, so that it may be easily unbuckled and attached to the waist-belt.

[Printed, 5½*d.*]

A.D. 1853, November 3.—N° 2550.

REEVES, Charles.—" Improvements in the manufacture of " swords, bayonets, and sword-bayonets."—(Provisional Protection only.)

It is proposed to cut out blanks, or pieces of iron or steel, of such a shape that they may be readily converted into swords or bayonets.

[Printed, 2½*d.*]

A.D. 1853, November 8.—N° 2590.

GRAHAM, Edmund Hugh.—" Improvements in fire-arms." Breech-loader. Charge magazine.

A rotatory cylindrical magazine, containing ammunition chambers concentrically arranged, is attached to the side of a gun, with self-acting charging or feeding apparatus for inserting the charge in the breech end of the barrel.

[Printed, 9½*d.*]

A.D. 1853, November 19.—N° 2690.

POOLE, Moses.—" Improvements in breech-loading fire-arms, " and in cartridges for use with such arms."—A communication.

A breech-pin, which slides in a chamber in the rear of the barrel, is connected by a link to a bar or blocking piece, turning on centre, rigidly connected with the barrel and moved by a lever. The nipple is attached to the breech pin. By depressing the lever, the blocking piece is raised, and, by means of the link, draws back the sliding breech-pin and exposes the barrel to admit the charge. The apparatus may be fitted to a double-barrelled gun. A cartridge is used, having a wooden base or wad at its rear end, which is perforated to allow the flash of the cap to ignite the charge. The wad is surrounded with fibrous packing, to make a tight fit, and is left behind and removed after each discharge.

[Printed, 5½*d.*]

A.D. 1853, November 17.—N° 2697.

BRAND, Richard Farmer.—" Improvements in fire-arms and " ordnance."—(Provisional Protection only.)

To prevent any expansion near the powder chamber, that part of the barrel is to be made thicker, or a steel collar is to be driven thereon.

[Printed, 4½*d.*]

A.D. 1853, November 22.—N° 2712.

ADAMS, Robert.—" Improvements in fire-arms." Revolvers.

To render the action of the lock more easy, the first effort of pulling the trigger is made to overcome the mainspring, cock the hammer, and turn the revolving breech-piece; the second is to discharge the fire-arm, and, requiring but little force, will not disturb the aim. For this purpose " a driver " is used, which is " put " in motion by the trigger which acts on a notch of the hammer, " and overcomes the mainspring, a pall or catch then retains the " hammer at cock. On again pulling the trigger, the driver moves " away the pall or catch, and releases the hammer," with a small effort.

[Printed, 5½d.]

A.D. 1853, November 23.—N° 2729.

BRADY, John Drumgoole.—"A new arrangement of straps "for slinging knapsacks."

The straps are passed each through the loops, and, terminating in a buckle at one end, are passed round the knapsack and buckled at its bottom edge. To each strap is attached a slide or loop; another strap goes over the shoulder and is brought round the back, and fastened by a loop on the under side of the knapsack. Or the knapsack may be carried by one broad strap round the body, to which two shoulder-straps are connected.

[Printed, 4½*d.*]

A.D. 1853, November 29.—N° 2778.

BELLFORD, Auguste Edouard Loradoux.—"Improvements in fire-arms." Breech-loading needle-gun.—A communication.

A moveable sliding breech is linked to, and actuated by, the trigger-guard, which is hinged at its anterior part. The sliding breech is perforated, to allow the needle to act. Cartridges, with perforated copper or metal, or other bases are used, which are withdrawn after the explosion by a "moveable chamber-mouth" and suitable apparatus.

Different kinds of self-priming cartridges are described, also apparatus for giving traversing motion to the gun-barrel.

[Printed, 7½*d.*]

A.D. 1853, December 6.—N° 2829.

HADDAN, John Coope.—"Improvements in the manufacture "of cartridges, and of wads or wadding for fire-arms."

The cartridges are made weaker in those parts which require to burst to allow the powder to escape than in the other parts. The cartridge case may be made in different ways, as with gores at the tail end, which burst on pressure being applied in ramming them, or by affixing a metal ring that catches in the barrel near the powder chamber, and tears the cartridge; wads, having a seat or receptacle of a conical shape, are made by pressing fluid pulp or suitable plastic materials in moulds.

[Printed, 6½*d.*]

A.D. 1853, December 6.—N° 2839.

NEWTON, Alfred Vincent.—" Improvements in fire-arms " and ordnance." Breech-loaders.—A communication.

A hinged breech plate is fixed at the rear end of the barrel, and is secured, in the case of cannon, by a hinged strap or bridle, and in small arms by a moveable wedge, operated by a lever. The breech plate has a projection to enter the bore of the barrel, to break the cartridge, and elastic packing is interposed between the rear end of the barrel and the surface of the breech plate, to make a tight joint. Disc "primers" are supplied from a self-acting magazine.

[Printed, 6½*d.*]

A.D. 1853, December 15.—N° 2910.

BELLFORD, Auguste Edouard Loradoux.—" An improve" ment in 'blasting powder' for mining and other operations of a " similar nature."

To manufacture 100 lbs. of this powder, take

19½ lbs. of charcoal, good,
68 ,, of saltpetre, ,,
12½ ,, of sulphur, ,,

mix, press, and granulate them. Dissolve chlorate of potash in water until the water is saturated; sprinkle the solution on the powder, and saturate it; dry it in a room at about 100° F. for four days, and use it unglazed.

[Printed, 2½*d.*]

A.D. 1853, December 16.—N° 2921.

TRANTER, William.—" Improvements in fire-arms, and in " bullets and waddings to be used therewith." Breech-loaders. Revolvers. Grooved bullets.

The breech-loading apparatus consists of a plug or chamber, moving horizontally on a vertical pivot attached to the breech end of the barrel. The mouth of the plug or chamber is moved out on one side to receive the charge; it is then turned back and pushed up to the near end of the barrel by a set screw acting at the rear end of the barrel and plug, in a line with its axis.

Revolvers are constructed with a set screw, acting in a similar manner, and has lever ramrods. Locks suitable for these pieces are described. Bullets are made with a circular groove round the rear end, which is filled with grease; the explosion compresses the bullet and forces out the grease.

Or, the grease is inserted in grooves or cavities in the wads, and is in like manner forced out by the explosion. Reference is made to former Letters Patent, dated January 28, A.D. 1853, (see Patent N° 212, p. 134,) to which these improvements may be applied.

[Printed, 7½*d.*]

A.D. 1853, December 16.—N° 2924.

WILLIAMS, Thomas.—" An improved revolving pistol."

The cock causes the breech-piece to turn round by means of a pall attached to it, and acting with a feather spring upon a ratchet wheel connected to the breech-piece. Between each nipple is a "partition," against which a projecting piece on the lower part of the cock acts so as to lock the breech-piece when the pistol is cocked. The upper part of the trigger has also a wedge-shaped projecting piece which locks into a groove in one of the "partitions" when the trigger is pulled.

The lock is enclosed by a moveable side piece.

[Printed, 6½*d.*]

A.D. 1853, December 17.—N° 2938.

HORTON, Joshua.—" Vessells." Cylindrical vessels which may be used for holding gunpowder are made by cutting a tube into lengths, and welding or otherwise fastening on top and bottom pieces.

[Printed, 7½*d.*]

A.D. 1853, December 24.—N° 2987.

COLES, Richard George.—" Improvements in the locks of " fire-arms." Mainspring.—(Provisional Protection only.)

It was proposed to use vulcanized india-rubber or other similar substance for mainsprings of gunlocks instead of the common steel springs.

[Printed, 2½*d.*]

A.D. 1853, December 28.—N° 3008.

MACINTOSH, John.—"An improvement in discharging projectiles." Rotating cannon.

Small cannon or rocket tubes are mounted in frames connected with suitable apparatus for putting the cannon or rocket tube in rapid rotatory motion before the discharge takes place, so that before the projectile receives its forward motion it has had imparted to it a motion round its axis while in the tube or cannon. This rotatory motion is intended to produce the effect of rifling. Cannon made to rotate in this way have their touch-holes in the rear exactly in a line with the axis of revolution. Rockets so discharged are said not to require sticks.

[Printed, 2½*d.*]

A.D. 1853, December 31.—N° 3,044.

CLERVILLE, Francois Aristide.—" An improvement in the " construction of fire-arms." Breech loader.

A moveable breech called a " fly breech " is attached in the rear of the barrel to the frame of the stock; it turns on a pin parallel to the axis of the bore. When the " fly breech " is turned back on its pin the rear of the barrel is exposed to admit the charge, the breech is then pushed into its place and closes the barrel. Other modifications are described.

[Printed, 8½*d.*]

1854.

A.D. 1854, January 19.—N° 129.

NORTON, John.—" Improvements in effecting communications " between the different parts of railway trains." Signals. Explosive projectiles.

Projectiles that explode on the percussion principle, or arrows that burn as they travel through the air, are used for making signals. They are to be shot from a cross-bow. By such means communications may be made by a guard of a railway train to an engine-driver.

[Printed, 7*d.*]

A.D. 1854, January 20.—N° 141.

FIELD, James John.—" Improvements applicable to guns, " cannon," &c. Telescope sights.—(Provisional Protection only.)

A telescope with five cross-lines is attached to the fire-arm, and aim is taken by adjusting the cross-lines upon the object. Apparatus connected with the hammer causes the eyepiece of the telescope to move forward as the piece is discharged, and thereby prevents the eye from being injured by the recoil.

[Printed, 3*d.*]

A.D. 1854, January 23.—Nº 157.

ARMSTRONG, CHARLES CLARKE, and PURSALL, WILLIAM. —" A new or improved percussion cap."

The cap consists of an outer case, in the bottom of which the percussion powder is introduced and an inner case of thin metal, and the percussion powder is contained between the two. The interior case is made or ground so thin that it is easily ruptured by the explosion.

[Printed, 6*d.*]

A.D. 1854, January 27.—Nº 203.

CHURCH, WILLIAM, and GODDARD, ASPINWALL SAMUEL. —" Improvements in ordnance." Breech-loaders.—(Provisional Protection only.)

The piece is bored through, and a slot is made in the breech end, in which two wedges slide. The inner one has its narrow end downwards, the one next the breech end has its narrow end upwards. The wedges are raised and depressed by a lever, and expose or close the rear end of the barrel as required.

[Printed, 5*d.*]

A.D. 1854, January 30.—Nº 225.

COOPER, JOSEPH ROCK. — Improvements, &c. in " rolling " gun-barrels, tubes, and bars."—(Provisional Protection only.)

Conical or taper grooves are to be formed in the rolls, by causing them to revolve slowly and introducing between them a revolving conical drill of the shape and dimensions of the groove required to be cut in rolls, so as to fit them for rolling gun-barrels.

[Printed, 3*d.*]

A.D. 1854, February 1.—Nº 252.

WENHAM, FRANCIS HERBERT. — " Improvements in fire" arms." Breech-loaders.

A moveable breech turns on a horizontal pin at right angles to the axis of the breech, and is turned upwards to receive the charge by a handle; the handle also draws back the conical fore end of the breech from a recess formed in the breech case, into which the barrel is screwed. When the breech is turned back the nipple may be made to receive caps from a suitably shaped magazine by means of self-acting apparatus.

[Printed, 6*d.*]

A.D. 1854, January 6.—N° 287.

VANDER MEERE, Auguste Louis Nicolas Comte.—"The manufacture of artificial whalebone," for gun-stocks and ramrods.—A communication.

Horn is softened and made flexible by the use of glycerine, and may be moulded into the required shapes for forming gun-stocks, ramrods, &c.

[Printed, 4*d.*]

A.D. 1854, February 9.—N° 312.

FONTAINE MOREAU, Peter Armand le Comte de.—"Improvements in fire-arms."—A communication. Self-priming apparatus.

Percussion caps are contained in a suitable tube and by self-acting apparatus are deposited on a moveable priming piece which is made to slide forward and place the cap on the nipple, by the pressure of the thumb.

[Printed, 9*d.*]

A.D. 1854, February 22.—N° 424.

NEWTON, William Edward.—"Improvements in fire-arms "and in projectiles."—A communication. Breech-loaders and cartridges.

A tubular magazine under the barrel is filled with the cartridges, which are pressed forward by a spring, and are made to enter into a hole in a sliding block, moved up and down by a lever forming a trigger guard; the block is raised by the trigger guard until the hole is exactly opposite to the rear end of the barrel. A piston is then pushed forward by suitable apparatus, and discharges the detonating priming placed in the rear end of the cartridge.

A conical bullet is used; it is made with a recess in its rear end, it is partly filled with gunpowder, on which a disc with a detonating priming is placed. A disc or wad of cork covers the base, and is left behind after the discharge. The bullet has a groove round its base which is filled with grease.

[Printed, 10*d.*]

A.D. 1854, February 22.—N° 429.

COLT, Samuel.—"Improved machinery for rifling fire-arms."

Several barrels are arranged side by side, each is attached in a hollow axle, which receives an intermittent motion after every cut made by the rifling tools. The cutters are "mounted loosely in " traversing rods," and are "kept up to their work by means of advancing wedges." The rods receive "an axial motion through " the agency of a vibrating rod or arm," which regulates the amount of twist. The drawings showing the different parts of the machinery should be consulted.

[Printed, 1*s.* 4*d.*]

A.D. 1854, February 27.—N° 472.

STIRLING, John Davie Morries.—" Tubes and cylinders of " steel," applicable to gun-barrels. Steel is cast in the form of short tubes, which are afterwards extended by heating them, and hammering, drawing, or rolling them.

[Printed, 3*d.*]

A.D. 1854, February 28.—N° 479.

THOMAS, Frederick Samson.—" A new rifle carriage."

The carriage travels on four wheels, and supports a platform on which are two cases, each containing about ninety rifle-barrels, ranged in tiers in adjustable racks. The barrels are loaded at their breeches, their ends being closed by blocks, behind which are india-rubber pads or buffers. This arrangement of barrels may be applied to fixed batteries and ships' decks.

[Printed, 10*d.*]

A.D. 1854, March 1.—N° 495.

EHRHARDT, Wilhelm.—" Improvements in the construction " of ordnance and fire-arms, and in loading the same." Breech-loader.—(Provisional Protection only.)

The Provisional Specification describes, with the aid of drawings, a barrel, underneath the breech of which is attached a segmental piece moving on a centre. In one position a passage through the segmental piece allows a cartridge to be inserted in the exposed breech end of the barrel, and by turning a handle the breech end is closed.

[Printed, 5*d.*]

A.D. 1854, March 8.—N° 549.

EDINGTON, James Charles.—" Working machinery for pro-" pelling vessels and firing guns."—(Provisional Protection only.)

Carburetted hydrogen gas and atmospheric air are proposed to be exploded in a cylinder so as to give motion to a piston. For guns the gas is to be exploded in a suitable chamber and employed for propelling projectiles.

[Printed, 3*d.*]

A.D. 1854, March 13.—N° 599.

JOHNSON, JOHN HENRY.—" An elastic breeching apparatus " for cannons."—A communication.—(Provisional Protection only.)

The breeching apparatus consists of india-rubber springs in the form of discs, held between metallic rings, through which pass rods. The springs are to be used in the place of ordinary rope breechings.

[Printed, 3*d.*]

A.D. 1854, March 22.—N° 675.

MADERSON, HENRY, and WARREN, GEORGE WILLIAM.— " Safety-guard for gunlocks."—(Provisional Protection only.)

A bolt working on studs or screws against the face of the lock plate has a catch-piece, which fits into a recess in the lower part of the hammer. The bolt is connected with a spring, and is released by pressing it at one end.

[Printed, 3*d.*]

A.D. 1854, April 1.—N° 747.

CLIFTON, Sir ROBERT JUCKES.—" An improved percussion " shell."—(Provisional Protection only.)

The shell is cylindro-conoidal, and has a nipple on its forward end communicating with a passage leading to a chamber inside it, which contains the charge of powder. It has wings to guide its flight.

[Printed, 3*d.*]

A.D. 1853, April 1.—N° 748.

BELLFORD, AUGUSTE EDOUARD LORADOUX.—" Improve- " ments in breech-loading fire-arms."

A sliding breech-piece in the shape of a curved wedge is made to slide in the rear of the breech, and exposes or closes its end.

The breech-piece is moved by a lever underneath. A bullet of a taper cylindrical form, with a conical front, is used, and the chamber is made of a taper cylindrical form to fit the bullet.

[Printed, 10*d.*]

A.D. 1854, April 4.—N° 768.

BENTLEY, JOSEPH.—“Improvements in breech-loading fire-arms.” Revolvers.

The lower part of the cock or hammer is elongated downwards, and projects in front of the trigger, and enables the piece to be cocked by pushing forward the lower limb of the cock with the thumb. The hammer is attached by a swivel link to the main-spring, the lower part of which acts as a trigger spring.

The breech-piece is made to revolve on the principle described in the Specification of a former Patent, dated December 4th, A.D. 1852. (See N° 960, p. 132.)

The ramrod is actuated by a screw, so that by turning a lever on its head the charge in the chamber opposite the ramrod is rammed down.

[Printed, 9*d.*]

A.D. 1854, April 12.—N° 861.

COLT, SAMUEL.—“Improved machinery for cutting or shaping metals.” Shaping locks and parts of fire-arms.

The Specification and drawings, which should be referred to, describe milling tools and screw-cutting machinery for shaping the various parts of gunlocks, &c.

[Printed, 3*s.* 4*d.*]

A.D. 1854, April 15.—N° 876.

FONTAINE-MOREAU, PETER ARMAND LE COMTE DE.—“Improvements in priming fire-arms.”—A communication.

A tubular magazine is attached to the stock, and self-acting apparatus fixes the cap upon the nipple.

[Printed, 9*d.*]

A.D. 1854, April 17.—N° 883.

BENTLEY, WILLIAM HENRY.—“Improvements in cannons, guns, and other fire-arms, and in projectiles for the same.” Breech-loaders. Projectiles.

The barrel is bored through, and the breech is closed by a plug which may be withdrawn and replaced by a screw. Apparatus for blowing a stream of air through the piece may be attached thereto. The projectiles have a stem or tail at their rear end, which fits into the narrow powder-chamber. They may have vanes or spiral ribs on their peripheries. Shells are made of segmental pieces put together.

The wheels and axles of a gun-carriage are to be made hollow, and in the latter ammunition may be stored.

The pieces may be coated with gutta percha to prevent rust. Signal tubes, acting with compressed air, may be used for conveying orders and making signals.

[Printed, 7*d.*]

A.D. 1854, April 17.—N° 885.

SMITH, James Alexander.—" Improvements in the manu- " facture of explosive projectiles."—(Provisional Protection only.)

The Provisional Specification relates to machinery intended to be used for the manufacture of cylindro-conoidal detonating shells by casting, or pressing, or turning.

[Printed, 3*d.*]

A.D. 1854, April 19.—N° 904.

CLARKE, Henry.—" Improvements in cannons, guns, and other " fire-arms." Breech-loaders.—(Provisional Protection only.)

A vertically revolving breech was proposed to be used, and the discharge is to be effected by electricity.

[Printed, 3*d.*]

A.D. 1854, April 21.—N° 917.

CRICKMER, Richard Jex, and CRICKMER, Frederick William.—" Improvements in cannons and field-pieces." Revolving cannon.—(Provisional Protection only.)

Cannons are proposed to be made with several barrels, which are to revolve horizontally round a fixed axis.

[Printed, 3*d.*]

A.D. 1854, April 27.—N° 955.

JOHNSON, John Henry.—" Improvements in revolving " fire-arms."—A communication.

The revolving piece is a cylinder with cylindrical or slightly conical holes bored through it, and a centre hole to receive the spindle, to which the single main barrel is attached by a double bayonet joint.

Each charge chamber is notched through to the outside of the cylinder at the back edge, to receive the percussion appliance which is made up with the cartridge, and projects through the notch.

The breech is hemispherical and has a smooth flat face like the end of the revolving cylinder with which it is in contact. A channel is formed in the breech on one side through which cartridges are introduced into the chambers in succession, as they are turned round by a ratchet motion, the channel is stopped by a "filling-up " piece hinged to the breech." A sliding rod is used for pushing out unexploded cartridges and cleaning the chambers.

[Printed, 7*d.*]

A.D. 1854, April 21.—N° 958.

CLARKE, Henry.—" Improvements in fire-arms and ordnance." Battery with many barrels.

Many barrels (say thirty) open at each end are fixed horizontally in a suitable frame in a row. In the rear of the row of barrels is a revolving cylinder mounted on a horizontal axis, round the cylinder are fixed a series of breech-pieces or charge-chambers in rows or parallel lines ; by turning the handle of the cylinder, a row of charged breech-pieces is brought up to the row of barrels, and the discharge may be effected by electricity or in any other convenient way. The breech-pieces or charge-chambers which are turned away from the barrels are charged in succession, and a constant fire is maintained by moving them continuously up to the line of fixed barrels.

[Printed, 10*d.*]

A.D. 1854, May 3.—N° 993.

RICHARDS, William Wesley.—" Improvements in loading " certain kinds of fire-arms." Ramrod for revolvers.

The ramrod is made to slide horizontally in guides connected with the main fixed barrel; on the fore end of the ramrod a rack is formed which is actuated by a pinion attached to a lever.

[Printed, 5*d.*]

A.D. 1854, May 23.—N° 1147.

DUFOUR, Louis Emile.—" Improvements in breech-loading " fire-arms."

The Specification and drawings, which should be referred to, describe breech-loading guns whose barrels have a swivel motion, the trigger guard being made to act as a key lever. Improvements in locks, hammers, nipples, cartridges, and ramrods are also detailed under seven heads.

[Printed, 10*d.*]

A.D, 1854, May 23.—N° 1153.

COX, John.—" Improvements in the manufacture of percussion " caps." (Letters Patent were not obtained, the Law Officer refused Provisional Protection.)

The percussion caps are to be lined with tin or other thin metallic foil; they are to be formed by gradual pressure after the detonating charge has been inserted.

[Printed, 3*d.*]

A.D. 1854, May 31.—N° 1208.

MINIE, Charles Claude E. — " Improvements in pro- " jectiles."

The projectiles are fitted in sockets, cases, or carriers, of a cylindrical shape, having a base with a recess in front to receive the projectile, and a cavity behind to allow the socket to expand and fill up the bore; projectiles of a diameter smaller than the bore may be thus fired. Screw threads may be formed on the carrier or on the projectiles.

[Printed, 6*d.*]

A.D. 1854, June 3.—N° 1237.

NEWTON, William Edward.—" Improvements in breech- " loading fire-arms."—A communication.

A " sector breech " is connected by a link with the trigger-guard which acts as a lever, and moves the sector-breech in a concentric chamber formed in the rear of the barrel. The rear face is curved, and the front face has a projecting plug which enters into the barrel, the sector-breech itself not being pushed close to the barrel. The touch-hole passes through the centre of the plug, and communicates with the barrel through a conical projection on the end of the plug.

[Printed, 7*d.*]

A.D. 1854, June 5.—N° 1247.

NÉRON, Napoléon.—" Improvements in muskets, carbines," &c. Self-priming apparatus.

A magazine, and self-capping apparatus are used for supplying and placing caps upon the nipple. A plug or stopper is also attached to the cock, formed of vulcanized gutta percha or other suitable substance, to prevent the destruction of the nipple.

[Printed, 6*d*.]

A.D. 1854, June 10.—N° 1282.

DAWSON, Arthur Llewellyn.—" Improvements in ma-" chinery for cutting and shaping wood." Gun-stocks.

The Specification and drawings describe machinery for cutting gun-stocks and other articles in wood. A wheel, which is placed vertically, and has cutters projecting from it, is mounted in a swinging frame, to which are attached guides; these are kept in contact with the pattern required to be copied, which revolves on axes.

[Printed, 1*s*. 1*d*.]

A.D. 1854, June 16.—N° 1305.

BRINDLEY, William.—" Improvements in applying steam for " offensive and defensive purposes."—(Provisional Protection only.)

The invention consists in connecting tubes and flexible pipes of vulcanized india-rubber with steam-boilers, and charging the steam on its issuing from these pipes, with sand or noxious chemical compositions, which may be used on board ship or elsewhere against an enemy.

[Printed, 3*d*.]

A.D. 1854, June 20.—N° 1343.

REEVES, Charles, and WELLS, William. — " A new or " improved method of manufacturing certain kinds of metallic " tubes." Taper tubes. Gun-barrels.

The Specification and drawings describe machinery for forming taper tubes by the pressure of dies set excentrically on axes in a frame, in such a way that the periphery of the dies form an aperture in the centre of the frame through which the tube is drawn. The aperture may be made larger or smaller according to the position of the dies on their axes.

[Printed, 9*d.*]

A.D. 1854, June 20.—N° 1352.

M'LAINE, Alexander.—" An improved mode of constructing " and fitting gun-boats."—(Provisional Protection only.)

The gun-boats are to be made of iron, high at the stern and sharp, having a rudder at both ends. A large cannon is mounted amidships on bearings packed with vulcanized india-rubber. The gun is to be loaded by machinery worked by the engine that propels the boat.

[Printed, 3*d.*]

A.D. 1854, June 23.—N° 1388.

KEYSE, John.—" An improved method of loading muskets," &c.—(Provisional Protection only.)

The outside of the barrel and the bayonet are grooved to assist in tearing off the end of the cartridge easily.

[Printed, 3*d.*]

A.D. 1854, June 23.—N° 1390.

OSBORN, William Ellsworth.—" Improvements in breech- " loading guns or cannon."

A mortice is made in the breech of the piece, in which a cam-shaped breech-piece is worked by a long handle, which is nearly horizontal when the breech-piece is in its place. Trunnion-shaped projections are attached to the breech-piece, and slide in curved grooves cut in the sides of the mortice.

When the handle is raised and pushed forward towards the muzzle, the breech-piece is raised and the charge may be inserted in the barrel.

[Printed, 7*d.*]

A.D. 1854, June 24.—N° 1395.

BROOMAN, Richard Archibald.—" A new or improved pro-
" jectile for ordnance and small arms, and a sabot or plug to be
" employed therewith," &c.—A communication.

The projectile is in the shape of an elongated egg, with the smaller end tapered or curved inwards; an axial opening is made in the projectile, in which a spiral vane is fixed. A sabot or plug of wood or soft metal is used to fill up the bore.

[Printed, 8*d*.]

A.D. 1854, June 26.—N° 1404.

BAIN, Alexander.—" Improvements in fire-arms, and the
" apparatus connected therewith." Breech-loaders.

In the breech end of the piece a suitable opening is made, in which slides a moveable breech-piece, at right angles to the bore of the gun. The breech-piece is of suitable length, and contains a series of chambers, one above the other, for receiving the charge; by raising or depressing the breech-piece, the chambers are brought successively in a line with the bore of the piece. Several breech-pieces may be used with the same barrel.

Suitable apparatus is described for loading and priming the chambers simultaneously or singly.

[Printed, 2*s*. 10*d*.]

A.D. 1854, July 13.—N° 1536.

LANE, Arthur James. — " Improvements in breech-loading
" fire-arms."

A moveable breech turns on centres attached to the break off, to which the barrel is also attached by two side straps, so that both the breech-piece and the barrel have a hinge motion upwards. The centres on which the barrel turns are behind, and above those of the breech-piece, so that a conical projection on the breech-piece may fit into a recess in the barrel. A tight joint is further secured by means of a moveable collar, which may be replaced when worn.

Suitable catches and springs are described for holding the parts and connecting them with the stock.

[Printed, 10*d*.]

A.D. 1854, July 20.—N° 1597.

PALLISER, WILLIAM.—" Improvements in projectiles for fire-" arms and ordnance generally."—(Provisional Protection only.)

Wood and metal are proposed to be combined together to form projectiles which have the centre of gravity forward.

Helical projections are to be formed on the projectile to cause rotation. Shells which ignite by percussion are described.

[Printed, 3*d.*]

A.D. 1854, July 21.—N° 1599.

LILLIE, SIR JOHN SCOTT.—" Improvements in fire-arms." Rests. Barrels mounted in tiers in a carriage.

A long bayonet or sword attached to a musket is used as a rest.

Barrels are mounted on pivots, or fixed in a row or in tiers, on a platform, or on shelves fixed in a carriage, and may be simultaneously or successively discharged. A revolving breech-piece, containing several chambers, is connected with each barrel, and by turning a handle all the charges in the chambers may be discharged by suitable apparatus which causes the caps to explode, the breech-pieces may then be removed and replaced by others ready charged.

[Printed, 5*d.*]

A.D. 1854, July 21.—N° 1607.

BELLFORD, AUGUSTE EDOUARD LORADOUX.—" Certain im-" provements in breech-loading fire-arms."—A communication.

An enlarged seat is formed in the rear of the barrel, in which is a roller or plug turning on a horizontal axis at right angles to the axis of the barrel. The roller is perforated to allow of the charge being inserted when the perforation and bore are in one line. A cavity is formed " within the seat, all around the roller, and only " leaving bearings at the end of the roller and around the pro-" jecting end of the barrel." Suitable openings are provided for the escape of the gas from the cavity.

[Printed, 7*d.*]

A.D. 1854, July 26.—N° 1639.

CHURCH, WILLIAM, and GODDARD, SAMUEL ASPINWALL.—"An improvement or improvements in ordnance." Breech-loader.

A slot or mortice is formed in the breech end of the gun, which is bored through. A compound or double wedge slides in the mortice, and is moved by a lever. The front wedge is the larger, and has its thin end downwards; the rear wedge has its thin end upwards. The wedges are fastened in their place by a pin, which passes through grooves formed in their faces, which are in contact, the grooves, when together, forming a circular hole. The wedges have perforations of the size of the bore, and are moved down by the lever in such a way that the rear one is first started, and when both are depressed their perforations coincide with the bore of the piece, and admit the charge from the rear. Behind the powder chamber an annular ring or collar is placed in a recess; it is pressed against the face of the front wedge during the discharge, and so forms a tight joint.

The face of the front wedge is formed by a moveable plate of metal, which may be replaced when worn by withdrawing it from its dovetailed seat.

[Printed, 9*d.*]

A.D. 1854, July 27.—N° 1652.

BURLEIGH, Richard Clarke.—" Improvements in guns and " in the shot or other projectiles fired therefrom."—(Provisional Protection only.)

It is proposed to detain the projectile in its place in the gun by means of a rod or chain, which holds it until the explosive force is sufficient to break the rod or chain, and liberate the projectile.

[Printed, 5*d.*]

A.D. 1854, August 1.—N° 1694.

NEWTON, William Edward.—" Improvements in the con- " struction of repeating fire-arms."—A communication.

An escapement apparatus, similar to those used in time-pieces, is applied to cause the breech-piece to rotate, " by exhausting at " intervals a reservoir of power obtained by the compression of a " spring or springs." The compression is effected by moving the barrel on the hinge which connects it to the stock. The drawings should be referred to.

[Printed, 11*d.*]

A.D. 1854, August 2.—N° 1700.

PALMER, George Holworthy.—" Improvements in guns, " gun-carriages," &c. Breech-loaders.—(Provisional Protection only.)

The barrel of the gun is bored through, and the breech end closed by a key or cotter, actuated by a lever; or the breech-piece may be attached to the trunnions by side bars.

The recoil of a gun may be lessened by causing a rod attached to it to work as a piston in an air-tight cylinder, filled with a suitable fluid.

[Printed, 5*d.*]

A.D. 1854, August 11.—N° 1754.

REIMANN, Joseph, and SAUERMANN, Friedrich.—" Improvements in fire-arms." Breech-loading needle gun. Bullets.

The breech end of the barrel is attached to " a flat box," in which is fitted a circular plug containing a cylindrical charge chamber. The bottom of the plug is provided with a pin which passes through the bottom of the box; to this is attached a lever. When the gun is to be loaded the plug is turned to the right until the charge chamber corresponds with an opening in the side of the box.

Needle apparatus is used, the needle is drawn back or cocked by turning the plug back.

The percussion patch is attached to a small projection made on the rear of the bullet to receive it.

[Printed, 10*d.*]

A.D. 1854, August 11.—N° 1756.

LAWRENCE, Thomas.—" Improvements in the manufacture of " bayonet blades," &c.

The grooves are made upon bayonets by tilting or stamping with a hammer worked by machinery, instead of employing hand labour for forging them.

[Printed, 3*d.*]

A.D. 1854, August 15.—N° 1776.

ALDBOROUGH, Earl of, O'Neale Benjamin.—"Improvements in projectiles."

Projectiles are made of such a form that their greatest diameter or transverse section is at the extreme foremost part. Air channels are made through the projectiles which are trumpet-mouthed towards the front. The hinder part may be filled with bursting composition.

Several air channels may be employed and combinations of different metals may be used, as iron or steel with lead or other soft metal.

[Printed, 9*d.*]

A.D. 1854, August 15.—N° 1777.

NORTON, John.—" Improvements in bolts and projectiles for " fire-arms."

Long projectiles in the shape of bolts may be fired with suitable wads. A percussion shell may be attached to the head of the bolt. The bolt may be made of hard metal, or wood, or clay, or cement.

[Printed, 5*d.*]

A.D. 1854, August 16.—N° 1784.

HIGGINSON, Francis. — " Improvements in the mode of " laying, directing, and aiming with ordnance," &c.—(Provisional Protection only.)

A steel pointer is fixed on a centre piece so as to coincide with the axis of the bore. Attached to the carriage or bed is a graduated arc. The position of the pointer and reading on the arc will show the angle at which the piece is to be laid for a given distance.

[Printed, 3*d.*]

A.D. 1854, August 16.—N° 1789.

SIDDONS, William.—" Improvements in locks for guns and " other fire-arms."

Two separate bearings, one inside and the other outside the plate of the lock, are provided for the ends of the axis of the tumbler. The tumbler is provided with a long arm, from which is suspended a long swivel working on a knife edge, the other end of the swivel terminates in a knife edge on which the free end of the main spring bears.

[Printed, 5*d.*]

A.D. 1854, August 23.—N° 1851.

NORTON, John.—" Apparatus for igniting explosive and com-" bustible materials."

Explosive compounds such as are used for lucifer matches are enclosed in tubes of glass or pipe clay, and are hermetically sealed. The tubes may be used as igniters for shells or for railway signals.

[Printed, 3*d*.]

A.D. 1854, August 25.—N° 1868.

BESSEMER, Henry.—" Improvements in guns for throwing " projectiles," &c. Self-acting breech-loader.

The Specification and drawings, which should be referred to, describe guns in which the re-active force of the exploded gunpowder is made to set in motion self-acting apparatus, by the agency of water, air, or steam, under pressure, in such a way that the piece reloads and discharges itself rapidly.

The gun is cleansed and cooled by forcing water through the bore, or through suitably formed passages.

[Printed, 1*s*. 5*d*.]

A.D. 1854, August 30.—N° 1897.

MEYERS, Barnett.—" Improvements in walking-stick guns." —(Provisional Protection only.)

The main barrel is bored throughout, and the discharging apparatus forms a separate piece, which is attached at pleasure to the barrel.

The piece is discharged by needle apparatus.

[Printed, 3*d*.]

A.D. 1854, September 7.—N° 1954.

ADAMS ,Robert.—" Improvements in breech-loading fire-arms."

A chamber is made in the breech end of the barrel to receive the charge; into this fits the end of a sliding plug, which is retained in its place during the discharge by turning a lever fixed on the slide over a projection on the barrel. A bullet is first introduced into the barrel at the breech, then a cartridge consisting of powder in front and a bullet behind. The explosion thus takes place between two bullets, and the rear one makes a tight joint.

[Printed, 1*s*. 1*d*.]

A.D. 1854, September 8.—N° 1961.

HACKETT, John.—" An instrument applicable to projectiles " to be discharged from cannon, whether rifled or otherwise, as a " means of increasing the destructive power of such projectiles." (Letters Patent were not obtained, Provisional Protection was refused by the Law Officer.)

The Provisional Specification merely stated the invention to consist in an instrument of iron, or iron and steel, fastened on the front end of the projectile. This description was insufficient.

[Printed, 3*d*.]

A.D. 1854, September 11.—N° 1976.

RIGBY, John.—" Improvements in fire-arms and guns, and in " waddings to be used therewith." Safety catch. Double barrels. Rifle bore. Lever ramrod.

A safety catch is fixed outside the lock, which takes into a notch in the cock.

Barrels are connected by bands or straps, a suitable wedge being driven between them to fix them tightly.

Rifle guns are made with a bore whose section resembles a ratchet-wheel with two or more teeth, the front faces of the teeth being flat.

Felt or other wads are attached to the centre, of calico or linen patches, made in the form of a cross.

A lever ramrod is used for revolvers, the long arm of which folds down underneath the stock.

[Printed, 10*d*.]

A.D. 1854. September 12.—N° 1985.

FORBES, Charles Wentworth.—" An improved rest for " fire-arms."

A self-winding reel is attached to the arm, or knee, or foot. A line or cord is passed from the reel on the arm through a ring on the muzzle of the piece, and is attached to the foot, and being held in a state of tension by upward pressure forms a support or rest for the gun.

[Printed, 6*d*.]

A.D. 1854, September 14.—N° 2000.

ADAMS, ROBERT.—" Improvements in machinery for boring and " rifling the barrels of fire-arms."

The Specification and drawings, which should be referred to, describe a self-acting lathe for boring barrels with a hollow boring tool; water is forced through the tool by a force pump and removes the cuttings.

The rifling machine is self-acting, and stops when the cut is finished.

A tool with a chisel edge instead of a serrated surface is used for rifling the barrels.

[Printed, 7*s.* 0*d.*]

A.D. 1854, September 22.—No. 2046.

LAWRENCE, THOMAS.—" Improvements in machinery or ap" paratus to be employed for the purpose of shaping and finishing " certain parts of bayonets."

The Specification and drawings describe machines for turning, cutting, or grinding the sockets, rings, necks, collars, and shoulders of bayonets, instead of shaping and filing them by hand.

[Printed, 2*s.* 7*d.*]

A.D. 1854, September 27.—N° 2073.

HOLLAND, JOHN SIMON.—" Improvements in large and small " fire-arms and in the preparation of their charges." Cartridges. Enlarged chamber. Testing or proving machine.

Cartridges are made up in such a manner that the powder is placed between two discs connected by rods, which must be snapped before the projectile is moved. A core of highly explosive compound may be placed in the charge. An enlarged chamber is employed.

Hydraulic apparatus is used for proving or testing the strength of the barrels.

[Printed, 7*d.*]

A.D. 1854, September 28.—N° 2089.

LANCASTER, CHARLES WILLIAM.—" Improvements in fire" arms and in cartridges to be used therewith." Breech-loaders. Cartridges.

Two arrangements of breech-loading apparatus are described. The barrel is screwed into a breech-piece, in which works a reciprocating plunger or bolt, which is locked by projections engaged in suitable grooves during the explosion. The cartridge is inserted through an aperture at the top, which is closed when the bolt is pushed up to the end of the barrel. The piece is charged by inserting a bullet and then a cartridge formed with powder at the fore part, and a bullet or disc of soft metal behind, so that when the powder is fired one bullet is driven out and the other bullet or the soft metal disc remains behind and forms a tight joint. The bullet remaining is pushed forward by a rod working in the reciprocating bolt, and is driven out at the next discharge.

When a soft metal base is used, a piece of tape may be affixed to the cartridge by which the blank or residuum after explosion may be withdrawn.

The aperture of the breech may be " closed by a breech swivelled " on to a closing bolt."

A cartridge having a concave perforated wad for its base may be used. Fire is flashed through the perforated wad.

Breech-loading fire-arms may be loaded at the muzzle by inserting in the barrel at the breech end a compound disc composed of hard and soft metals. The drawings should be referred to.

[Printed, 10*d.*]

A.D. 1854, October 10.—N° 2170.

CROSLEY, HENRY.—"Improvements in the manufacture of " waddings for cannon and fire-arms."

Wads are made of refuse paper, pulp, or "half-stuff," of spent tan or hops, mixed with glue, size, or other adhesive substances.

The wads are formed by pressure in a press or in moulds into shapes suitable for various purposes.

[Printed, 4*d.*]

A.D. 1854, October 11.—N° 2175.

TAYLER, WILLIAM HENRY.—" Improvements in cartouch belts " or cases," &c.—(Provisional Protection only.)

The belt consists of an inner case containing a series of holes for the cartridges, which may be moveable on the belt, and an outer case forming a flap or cover.

[Printed, 3*d.*]

A.D. 1854, October 14.—Nº 2197.

HADDAN, John Coope.—" Improvements in the manufacture " of cannon and of projectiles for the same." Rifling machinery. Projectiles. Wads.

The Specification and drawings, which should be referred to, describe a mode of rifling guns with bores of oval or other curvilinear section. The grooves may be made by means of a circular cutter revolving on a shaft working in a hollow tube, fixed eccentrically in the bore of the cannon. The " twist " is given by turning either the cannon or the hollow tube.

Planing tools or cutters may be used with a guiding bed plate, having a truly formed surface on which a block or carriage slides backwards and forwards. A conical plug is inserted to form the breech

Projectiles are fired with suitable wads and wires, so arranged as to enable electricity to be employed as a discharging agent.

Projectiles are cast in a vertical position with a head.

Wads are made of compressed sawdust, refuse seed or pulp, or other materials, mixed with cements or oils or glue.

[Printed, 11*d.*]

A.D. 1854, October 18.—Nº 2226.

BELLFORD, Auguste Edouard Loradoux.—" Improvements " in breech-loading fire-arms."—A communication.

The barrel turns on centres working in fixed side pieces, and when turned down exposes the rear end to receive the charge. A tight joint is made by means of a "loose breech collar," into which the conical end of the barrel fits.

A tubular self-acting magazine is attached to the stock for supplying primers or caps.

[Printed, 9*d.*]

A.D. 1854, October 28.—Nº 2297.

LINDNER, Edward.—" Improvements in revolving breech fire- " arms and magazine."

The Specification and drawings, which should be referred to, describe a revolving breech-loading gun, to which are attached self-acting magazines for containing cartridges and charging the piece, and for containing and supplying primers or caps. Needle apparatus may be used for effecting the discharge.

[Printed, 1*s.*]

A.D. 1854, October 30.—N° 2305.

HADDAN, JOHN COOPE.—" Improvements in projectiles, and in " machinery for manufacturing the same." Rockets. Shells.

Rockets like those of William Hale (see Patent N° 10,008, p. 97,) and projectiles having such rockets in their interior are fired from rifled guns, and ignite while they are being propelled through the air.

Elongated shells are made with discs, rings, or ribs on their insides to strengthen them.

Projectiles are fired from rifled guns, with their conical tails fitting in conical recesses in the wads, to keep them concentric with the bore of the piece.

Projectiles are made with wings, which slide in the grooves in a rifled cannon.

[Printed, 8*d.*]

A.D. 1854, November 6.—N° 2342.

SHAW, JOHN.—"Improvements in guns and fire-arms."—(Provisional Protection only.)

It was proposed to cast a gun with two diverging barrels united at the breech, for firing two projectiles coupled by a chain.

[Printed, 5*d.*]

A.D. 1854, November 6.—N° 2346.

CHILDS, WILLIAM.—" An improvement in the manufacture of " pipes and tubes." Gun barrels.

Strips of metal tapered or chamfered at the edges are twisted round a cylinder, and welded as fast as they are brought together by rollers and apparatus described, so as to form gun barrels.

[Printed, 10*d.*]

A.D. 1854, November 6.—N° 2348.

PACKMAN, FRANK JAMES WILSON.—" A method of compress- " ing air in air guns, and an improved air gun."—(Provisional Protection only.)

Air, after being compressed by an ordinary air pump, is to be subjected to further hydraulic pressure, and used in a revolving breech air gun.

[Printed, 3*d.*]

A.D. 1854, November 7.—N° 2351.

HARTOG, Carl Samuel Heinrich.—" Improvements in fire-" arms and in cartridges." Breech-loaders.—(Provisional Protection only.)

The barrel of the gun slides forward, and turns on pins to receive the charge at the rear end. The charge is fired by a needle. A safety bolt is attached to the lock.

[Printed, 3*d.*]

A.D. 1854, November 7.—N° 2352.

HOGG, Edward.—" Improvements in shot and shell."

Spiral grooves are made on the head or fore part of the shot or shell, to give rotatory motion thereto.

The rear part of the projectile is made hollow, so as to give a preponderance to the fore part, and may contain a bursting charge to be ignited by percussion.

[Printed, 6*d.*]

A.D. 1854, November 4.—N° 2355.

BAXTER, Frederick.—" A compound shell," &c.—(Provisional Protection only.)

Two charges are contained in the shell, which may be fired by two fusees at different times, or by a double connected fuse. The first bursting charge may be made to scatter grape, the second to destroy the shell.

[Printed, 3*d.*]

A.D. 1854, November 10.—N° 2394.

RIMMEL, Eugene.—" Improvements in combining matters to " be employed in coating fabrics and leather for military accou-" trements."

Alum and sulphate of iron are melted in rain water, soap is added, and the mixture is heated. Linseed oil may be added.

Particular proportions and directions are given for making the mixture, which may be used to coat fabrics or leather for military accoutrements, and be employed instead of india-rubber.

[Printed, 3*d.*]

A.D. 1854, November 13.—N° 2400.

FITZMAURICE, the Honourable William Edward.—" Improvements in bullets, shells, and other projectiles."

Projectiles are made screw-headed and taper to a point, so that the action of the external air on the inclined surfaces as they pass through the air may cause rotation.

Rockets are constructed on the same plan.

[Printed, *7d.*]

A.D. 1854, November 14.—N° 2410.

LAW, Henry.—" Improvements in guns and in the projectiles " to be fired therefrom."—(Provisional Protection only.)

It was proposed to enclose the gunpowder in a case or cartridge so constructed that it would be necessary to break or rend asunder the case or certain connecting ties or rods, in order to give the powder time to be thoroughly consumed.

[Printed, *1s. 2d.*]

A.D. 1854, November 14.—N° 2411.

PARSONS, Perceval Moses.—" Improvements in projectiles." —(Provisional Protection only.)

It is proposed to use hollow projectiles to which rotatory motion is imparted by the escape of the gases of an ignited charge from suitably shaped channels.

[Printed, *3d.*]

A.D. 1854, November 14.—N° 2412.

PEARSON, Samuel.—" An improvement in the manufacture of " gun-barrels, pipes, and tubes."

Two V shaped strips of metal of triangular section are wound spirally round a centre, one upon the other. The lower strip has the apex of its Λ upwards, the upper strip has the apex of its V downwards, so that a V of the upper strip fits between two V's of the lower strip. The two are in that position welded together.

[Printed, *5d.*]

A.D. 1854, November 14.—N° 2414.

BODLEY, George.—"Improvements in revolving cannon."

A breech-piece containing several chambers is connected with a single barrel.

The breech-piece is made to revolve horizontally on vertical axes.

[Printed, 9*d.*]

A.D. 1854, November 15.—N° 2422.

JOHNSON, John Henry.—"Improvements in air pistols."—A communication.—(Provisional Protection only.)

Air pistols, suitable for toys, are made to be discharged by the hand or with double barrels, &c.

[Printed, 3*d.*]

A.D. 1854, November 17.—N° 2437.

HIGGINS, James, and WHITWORTH, Schofield Thomas.—"Improvements in apparatus for moulding, for casting " shot, shells, and other articles."

Mould boxes are so constructed that the "junction of the parts " may be circular," they have similarly formed recesses or projections on their peripheries fitting each other. In connection with the circular mould boxes a plate or diaphragm is used, "upon " which the pattern or one half thereof is fixed, such plate being " provided with circular recesses or projections corresponding to " the diameters of the circular boxes."

Modes of filling and ramming the sand are described. The drawings should be consulted.

[Printed, 7*d.*]

A.D. 1854, November 17.—N° 2439.

KENNEDY, Thomas.—"Improvements in shot or projectiles." —(Provisional Protection only.)

Cylindro-conoidal shot are proposed to be made with hollow bases, into which are fitted moveable feather pieces; these are pressed into longitudinal slots by a piece of caoutchouc contained in the hollow of the projectile. When the shot is fired the feather pieces are to be pressed out, and give the shot rotatory motion.

[Printed, 3*d.*]

A.D. 1854, November 20.—N° 2454.

ADAMS, William Bridges.—"Improvements in projectiles," &c. Cannon.—(Provisional Protection only.)

The Provisional Specification describes long arrow-shaped projectiles, provided with wings or vanes, which may be fired from barrels with smooth bores. Cannon may be made by casting iron or brass or other metal round a wrought tube, and effecting a junction of the metals by the use of fluxes.

Wrought-iron hoops may be shrunk on the tubes.

Breech-loading cannon are made with a moveable wedge-shaped breech-piece, fitting in a slot in the breech end of the piece.

The gun may be mounted on the ball-and-socket principle, by having a swell where the trunnions usually are.

Shields of iron with angular fronts may be used to protect breech-loading guns.

Springs or elastic wheels are proposed to be used for field artillery.

Moveable practice targets may be made to run up and down hills and behind banks.

Ramrods may be made to serve as bayonets.

[Printed, *4d.*]

A.D. 1854, November 21.—N° 2459.

BEASLEY, William.—"Improvements in the manufacture of "gun barrels."

Two skelps, each having a semi-elliptical form in section, are bound with wire, and welded to form the barrel.

The barrel is heated and rolled upon a mandril until the section becomes truly circular.

The lump is then forged on. To form lumps a bar is rolled of a bridge-shape in its transverse section. This bar is then cut up into pieces of suitable lengths for forming lumps, the hollow side being fitted to the barrel.

The barrel is then straightened by rolling it between rolls similar to those described in the Specification of a former Patent, dated June 10, 1852. (See N° 14,163, p. 125.)

[Printed, *1s.*]

A.D. 1854, November 21.—N° 2462.

THOMAS, WILLIAM LYNALL.—" An improvement in projectiles " and in gun wads."—(Provisional Protection only.)

The object of the patentee is stated in the Provisional Specification to be to supply " air in safe and proper quantity between " the projectile and the powder." To effect this he proposes to make suitable air-chambers either in the rear of the projectile or in the wads employed.

[Printed, 3*d.*]

A.D. 1854, November 23.—N° 2473.

CRICKMAY, CHARLES.—" Improvements in single and repeat- " ing or revolving fire-arms, and in the mode of attaching bayonets " to breech-loading fire-arms." Breech-loaders. Revolvers. Self-primers. Bayonets.

In the breech-loading fire-arms the barrel and stock or lock frame are connected by a strong pin on which the breech-piece revolves.

Upon the pin are formed inclined planes, in connection with which work counter inclined planes, attached to a spring lever, working on the pin; the breech-piece is placed between the spring lever and the barrel, and a close junction is effected between the conical rear end of the barrel, and the countersunk mouth of the charge chamber by the relative action of the inclined planes.

Revolvers are, with suitable modifications, constructed on the principle above referred to.

Self-priming apparatus is used for supplying caps from a hollow chamber in the stock to the nipple.

The bayonet may be attached to the muzzle by a hinge joint, so that the blade lies on the underside when not in use, and is fixed by the action of a spring and detent. The drawings should be consulted.

[Printed, 1*s.* 5*d.*]

A.D. 1854, November 24.—N° 2487.

ELEY, WILLIAM.—" An improvement in the manufacture of ball " cartridges."

The bullet is made with a tang on its rear end; on the tang is placed first a perforated wad, then a varnished or other paper case with a perforated bottom to allow the case to be passed on the tang; a perforated thin metal disc is then passed over the tang, which is "upset" by a blow from a punch or hammer, and so fastens the paper to the bullet. Powder may be then poured into the case, and the cartridge may be made up and inclosed in an outer case, to which may be attached a tape, to allow of the outer case being readily torn off.

[Printed, *5d.*]

A.D. 1854, November 24.—No. 2489.

BESSEMER, Henry.—"Improvements in projectiles and in "guns, or orduance used for discharging the same." Projectiles with tangential channels. Ordnance formed in parts.

In order to give rotation to the elongated projectile when fired from a smooth bore, channels are formed in its interior, parallel to its axis, and communicating with cross channels, formed in a radial direction. The explosive gases from the charge of powder are made to enter the straight channels, and escaping from the radial channels nearly in the direction of a tangent to the periphery are to cause rotation.

The projectiles are to be turned truly and made to fit the barrel.

The projectiles may be charged with a composition which shall burn and discharge gases from the tangential holes, and so cause rotation. In the case of rockets the tangential holes should be in the front part and slanting towards the back. To reduce the weight of elongated projectiles a hollow space may be left inside them, they may be made smaller in diameter than the bore of the piece, and be fired with a wooden or other case fitting the bore.

Cannon may be made in two, three, or more parts, the parts having flanges with true surfaces, which are to be bolted together. Each part may be mounted and carried separately.

An enlarged chamber is to be used to receive the larger charges of powder required for the elongated projectiles, having its entrance equal in size to the bore of the piece.

[Printed 1*s.* 5*d.*]

A.D. 1854, November 25.—N° 2495.

HOLLAND, John Simon.—" Improvements in large and small " fire-arms, and in the preparation of their charges."

Barrels of small guns are made by twisting wire round a central core in right and left-handed spirals, and " brasing or cementing " by brass or gun metal."

Cannon are made by similarly twisting larger rods.

Canister shot are made of pieces of metal, which nearly fill the canister, and together form a cylinder.

Shells are made with small segmental pieces of metal closely packed in layers between the outer case and the bursting charge.

Shot are made with a spiral head, and when used for breeching with a steel centre or nose. To small arm projectiles a tail is appended, to prevent the powder from being crushed when the charge is rammed down.

[Printed 9*d.*]

A.D. 1854, November 27.—N° 2501.

CROFTS, John, and CARTWRIGHT, William.—" A " new or improved cannon and projectile." Breech-loader.—(Provisional Protection only.)

A longitudinal opening is made in the breech end of the cannon through which a cartridge is introduced. The bore and opening are closed by a screwed plug; a needle passing through the plug discharges the piece. The cannon may be rifled, and a hard metal projectile with a leaden or other soft metal coating may be used.

[Printed, 3*d.*]

A.D. 1854, November 30.—N° 2522.

MURRAY, Charles.—" Improvements in the manufacture of " ordnance, barrels of fire-arms, and hollow cylinders of iron." Barrels.—(Provisional Protection only.)

Taper slabs of iron are twisted in successive layers so as to form a cylinder; the grain or fibres of each successive layer is laid in the contrary direction to the preceding one, and the whole are united by welding.

[Printed, 3*d.*]

A.D. 1854, November 30.—N° 2523.

MESURIER, Frederick Le.—" An improvement in the manufacture of ball and shot cartridges."

When a ball cartridge has been filled with powder, a thin piece of wood or other suitable brittle material is introduced into the end of the case; this breaks under the pressure of ramming and allows the powder to escape.

[Printed, 3*d.*]

A.D. 1854, December 1.—N° 2525.

WHITWORTH, Joseph.—" Improvements in cannons, guns, " and fire-arms." Rifled fire-arms with polygonal bore. Breech-loaders.

Barrels of fire-arms may be made in segments by hooping together segments which are of a spiral shape, in such a manner that the line of junction of the segments follows the course of the spiral. The interior of the barrel so constructed is in the form of a polygonal spiral.

When it is important that the piece should not be too heavy, the tubular part is made in one piece instead of made in segments, and is rifled with the polygonal bore.

Projectiles mechanically fitted to the barrel are described as forming part of the patentee's rifle system. See Specification of Letters Patent subsequently obtained on April 23, 1855. (See *post,* N° 903, p. 213.)

Breech-loading fire-arms are made with an opening in the breech-piece in the rear of the barrel, in which a wedge-shaped piece slides vertically; the wedge is moved by a screw acting underneath the piece.

[Printed, 10*d.*]

A.D. 1854, December 1.—N° 2530.

RESTELL, Thomas. — " Improvements in guns." Breech-loaders. Self-loading apparatus.

The moveable breech-piece turns on a spindle whose axis is below and parallel to the axis of the bore. The breech is turned down by the trigger motion. A ram, actuated by a spiral spring and working inside the stock, may be used instead of a hammer.

A cartridge having a pointed rear end containing percussion powder is used.

A magazine for containing these cartridges and having self-acting apparatus for placing them in the breech-piece is described. A breech-piece sliding vertically may be employed.

The stock may be made in two parts, one sliding on the other, and be provided with a spiral spring so disposed as to break the shock of the recoil.

[Printed, 11*d.*]

A.D. 1854, December 1.—N° 2531.

CANTELO, WILLIAM JAMES.—"An improvement in the con-" struction of barrels of ordnance and small arms, and in balls or " projectiles used therewith."—(Provisional Protection only.)

It was proposed to fix in a slot near the muzzle of the barrel an inclined projection in such a manner that a projectile fired from the smooth barrel might receive rotation just as it issues from the muzzle by the action of the incline.

Projectiles may be made with notches to pass the inclined projections.

Hard projectiles are to be coated with soft metal.

[Printed, 3*d.*]

A.D. 1854, December 2.—N° 2542.

MAUDSLAY, JOSEPH. — "An improvement in ordnance." Breech-loader.

An oblong aperture is made in the gun at the breech end in which is placed a moveable breech-piece containing a chamber, and resting on two pivots. The breech-piece is moved sideways by a rack and pinion, or by other suitable means; and when the charge is inserted it is returned to its place in a line with the bore, and is pushed up against the rear end of the barrel by a powerful screw or wedge.

[Printed, 6*d.*]

A.D. 1854, December 6.—N° 2560.

COSTARD, CONSTANT, and COLLAS, GEORGE PHILIP.— " Improvements in projectiles."—(Provisional Protection only.)

Cylindro-conoidal projectiles are proposed to be made with projecting pieces of metal fitted to them having springs to give them elasticity. The projecting pieces fit into and follow the grooves made in rifled cannon.

[Printed, 3*d.*]

A.D. 1854, December 6.—N° 2566.

MORNAY, Edward De.—" A new construction of guns and a " new form of projectile," &c.—(Provisional Protection only.)

Guns are proposed to be constructed of a series of annular parts bolted together.

Projectiles of a cylindrical form may be used; they are smaller than the bore, and brass rings are to be fitted upon them connected by longitudinal bars so as to fill up the bore.

[Printed, 3*d.*]

A.D. 1854, December 7.—N° 2576.

HESELTINE, Samuel.—" Improvements in the construction " of cannon shot and shell." Cast-iron cannon with wrought-iron rings. Projectiles with spiral ribs.

Cast-iron cannon are made of a cylindrical shape, and on their rear end are shrunk wrought-iron tubes or rings.

Projectiles of small diameter are made with spiral ribs. A metal ring or washer is fitted on the rear end, so as to fill up the bore. The ring subsequently falls off from the projectile, which then presents a reduced diameter to the atmosphere.

[Printed, 7*d.*]

A.D. 1854, December 8.—N° 2581.

M'CONNELL, James Edward.—" Improvements in the con" struction and arrangement of ordnance."—(Provisional Protection only.)

Wrought-iron ordnance are to be made in the same way as the hollow axles of the Patentee, the breech-piece being either screwed or welded in.

The recoil of guns may be neutralized by mounting two or more guns on the same carriage and connecting their trunnions by rods to double-cranked axles in such a way that the recoil of one gun may tend to push the carriage forwards, while that of another tends to push it backwards.

[Printed, 3*d.*]

A.D. 1854, December 9.—N° 2586.

HINDE, Thomas Callender.—" Improvements in ordnance."—(Provisional Protection only.)

Ordnance is proposed to be made by bending up and welding the edges of a plate of iron, such as is used in the manufacture of steel, containing a small quantity of manganese.

This iron is heated to redness and hardened by quenching it in water.

[Printed, 3*d.*]

A.D. 1854, December 9.—N° 2588.

HIGGINS, James, and WHITWORTH, Thomas Schofield.—" Improvements in the manufacture of bayonets and in machinery or apparatus connected therewith."

The Specification and Drawings describe rolling and punching apparatus for manufacturing bayonets from bar metal, so as to produce the blade and socket in one piece. The necessity of welding them is thereby avoided.

[Printed, 7*d.*]

A.D. 1854, December 11.—N°. 2602.

HARVEY, William James.—" Improvements in fire-arms " when revolving barrels are used." Revolvers; lever ramrod; safety bolt.

A lever ramrod is described for loading the chambers.

A second safety bolt is added which locks or fastens another safety bolt that prevents the hammer from being accidentally moved.

[Printed, 8*d.*]

A.D. 1854, December 13.—No. 2624.

FISHER, Samuel.—" Improvements in ordnance and in machinery and apparatus to be employed in manufacturing the " same." Wrought-iron and steel ordnance.

The breech is first forged in the desired form. Wrought-iron or steel rings, or both combined, are then successively welded together until the full length of the piece is formed. Or a wrought-iron breech is turned out of the solid, and then a cylinder is cast in malleable iron and annealed; the two are united by screw threads.

[Printed, 10*d.*]

A.D. 1854, December 13.—N° 2629.

COURT, John, junior.—" Improvements in rockets."

Rockets are made with heavy fore ends. When fired from a gun the heavy end is first inserted in the barrel with a ring or washer of lead to prevent windage.

An ignition tube of copper or other material is inserted in the axis of the rocket. The rear end of the rocket is made with surfaces inclined to the central axis, so that the back fire rushing directly from the end of the rocket may impinge on the inclined surfaces and cause rotation.

[Printed, 10*d.*]

A.D. 1854, December 14.—N° 2633.

PADWICK, William Frederick.—" An improvement in projectiles."—(Provisional Protection only.)

Wings or feathers are proposed to be affixed to the sides of the projectile, which will fit in the grooves of rifled cannon.

[Printed, 3*d.*]

A.D. 1854, December 15.—No. 2645.

ADAMS, Robert.—" Improvements in fire-arms called re-" volvers."

The moveable axis on which the revolving breech-piece turns is fastened by a bolt formed with an inclined thread or screw, which when moved partly round takes into a recess in the axis.

A safety bolt is applied to fasten the short barrels, so that if the hammer be accidentally moved back it will not strike the nipple. A lever ramrod is attached to one side of the fire-arm.

[Printed, 6*d.*]

A.D. 1854, December 16.—N° 2648.

LIVSEY, Peter Joel, and WEILD, William.—" Improve-" ments in cartridges and projectiles, and in the construction, " mounting, and working of ordnance." Large ordnance. Percussion cartridges.

Cartridges are made with a projecting tube containing percussion powder; they are ignited by a spindle working in a hole in the breech, which is struck from the outside. Projectiles are made with a leaden ring or disc to fill up the bore; they may be provided with ribs which take into grooves in the cannon having an increasing twist. Very heavy ordnance may be made by bolting short cylinders together. A gun is described 18 inches in bore, weighing 100 tons.

Springs or buffers are used to take off the recoil. Suitable self-acting apparatus is described for mounting and working heavy pieces.

[Printed, 1*s.* 5*d.*]

A.D. 1854, December 20.—N° 2680.

HUYGENS, R. B.—"Improvements in ordnance and fire-arms, " and in the projectiles to be used therewith."

Barrels are made with wedge-shaped projections or indentations made in a straight or spiral direction, and have chambers smaller in diameter than the bore.

Cylindro-conoidal balls, made on geometrical principles, are described. A revolver is also described, having barrels with wedge shaped ribs or projections.

[Printed, 1*s.*]

A.D. 1854, December 21.—N° 2693.

GREENER, WILLIAM.—"Improvements in repeating military " rifles, carbines, and pistols, and in cartridges to be used there" with." Revolvers. Breech-loaders. Cartridges.

A reciprocating motion is given to the barrel of a breech-loading revolving fire-arm by means of a lever working underneath, which is provided with suitable links, pins, and catches. The barrel may be thus moved away from and towards the charging chambers. In the case of a single-barrel breech-loading gun, the breech is thrown up by a spring to receive the charge. A cone is formed on each chamber, which fits into the barrel and is grooved.

Cartridge cases are made of an alloy which melts at a low temperature, as zinc, lead, and bismuth. The nipple is made with a slit larger at the top than at the base.

[Printed, 1*s.* 1*d.*]

A.D. 1854, December 21.—N° 2695.

SMITH, ANDREW, and MACKENZIE, JAMES THOMPSON.— " Improvements in ordnance and small arms, by applying thereto " projectile force obtained from high-pressure steam."—(Provisional Protection only.)

A bath of fusible metal is to be heated to 1000° of temperature. Water in strong vessels is surrounded by the bath, and is converted into high-pressure steam, which is used as the projecting agent.

[Printed, 3*d.*]

A.D. 1854, December 22.—N° 2705.

PRINCE, Frederic.—" Improvements in the nipples of fire-" arms."

The touch-holes of nipples are made to communicate with the charge by curvilinear or very obtuse angled passages, so that the action of the flash is as direct as possible.

[Printed, 5*d.*]

A.D. 1854, December 22.—N° 2709.

DOWNIE, John.—" Improvements in fire-arms." Wrought-iron guns.—(Provisional Protection only.)

A wrought-iron cylinder of suitable size is heated and suspended in a mould. Molten cast iron is to be cast round it, so as to form a partly cast, partly wrought iron gun.

[Printed, 3*d.*]

A.D. 1854, December 22.—N° 2711.

BELLFORD, Auguste Edouard Loradoux.—" Improvement " in breech-loading fire-arms."—A communication.—(Provisional Protection only.)

A chambered breech is proposed to be fitted to the barrel " with " a male and female cone, and capable of receiving two motions," a reciprocating one in the direction of the barrel, and a hinge motion by which the mouth of the chamber is raised to receive the charge.

[Printed, 3*d.*]

A.D. 1854, December 27.—N° 2725.

DUNDAS, James.—" Improvements in the manufacture of " cannon and ordnance of every description."

Staves or bars of iron or other metal are hooped together by hoops in one or two layers. The hoops are accurately fitted, and may be heated and shrunk in one or more layers on the bars, so as to form a strong barrel. The barrel is bored subsequently.

[Printed, 7*d.*]

A.D. 1854, December 30.—Nº 2754.

BISSELL, Charles.—" Improvements in sights for rifles and " other fire-arms."—(Provisional Protection only.)

Sights are proposed to be made with two steel side-pieces of a bow shape. These are graduated and have notches into which the sight fits with a clicking noise as it is raised or depressed. The marksman can tell by "the click" the height to which the sight is raised.

[Printed, 3*d.*]

A.D. 1854, December 30.—Nº 2758.

PRESTON, Francis.—" Improvements in bayonets and in the " machinery for manufacturing the same."

The stop for the lock ring is made of the same piece as the socket. The lock ring is made of " run steel, and thicker where the depth " is diminished for the stop."

Suitable self-acting machinery is described for fluting and finishing the bayonet and socket.

[Printed, 10*d.*]

1855.

A.D. 1855, January 3.—Nº 17.

GODDARD, Samuel Aspinwall.—" A new or improved fire- " arm, a portion of which is applicable to ordnance." Battery carriage.

Barrels are arranged in rows or tiers, mounted on suitable framing on a carriage. Suitable means of discharge and of loading are described.

[Printed, 9*d.*]

A.D. 1855, January 5.—Nº 33.

PRINCE, Frederic.—" Improvements in cartridges for fire- " arms."—(Provisional Protection only.)

Cartridges are to be made with a paper tube and an elastic wad between the bullets and powder. The cartridge is to be pressed into the barrel, and is fit for use without tearing off part of the paper.

[Printed, 3*d.*]

A.D. 1855, January 10.—N° 61.

WILSON, THOMAS.—" Improvements in the manufacture of " bands used in the construction of small arms."

Bands used for uniting barrels of small arms to their stocks are cut out in the proper shape by self-acting machinery. Four or other convenient number of cutters are made to revolve on an axis, mounted after the manner of a lathe-head. The band is fixed in a clam or vice, and is moved with a sliding motion towards the cutters, which cut the band of the desired figure.

[Printed, 6*d.*]

A.D. 1855, January 10.—N° 65.

FULLER, WILLIAM COLES.—" Improvements in the construc- " tion and adaptation of india-rubber springs." Recoil springs for guns.

India-rubber springs are used, among other things, for taking off the recoil of muskets or rifles. Discs or rings of india-rubber are inserted between the end of the barrel and the but of the piece.

[Printed, 11*d.*]

A.D. 1855, January 26.—N° 67.

BESSEMER, HENRY.—" Improvements in the construction and " manufacture of ordnance."

The recoil of ordnance is diminished by allowing part of the elastic vapours caused by the explosion to escape through apertures made near the muzzle of the piece and nearly at right angles to the bore.

Ordnance may be cast of a mixture of steel and iron in suitable moulds, with iron core bars, used " for the purpose of chilling the " metal," or the piece may be cast solid and bored out. The metal should be prepared according to the process described in the Specification of Letters Patent granted to Henry Bessemer, January 10, 1855, for " improvements in the manufacture of iron and steel."

[Printed, 10*d.* See Abridgments of Specifications relating to the Manufacture of Iron and Steel, printed for the Commissioners of Patents, p. 185.]

A.D. 1855, January 11.—N° 73.

HALL, Edward.—"Improvements in the manufacture of gun-"powder."

Artificial heat is applied by the apparatus described, to the beds of incorporating gunpowder mills. Heated fluide in pipes or other receptacles are used where the beds are of cast iron, and where the beds are of marble or stone the interior of the mill may be heated. When it is requisite, the mill, or parts thereof, may be cooled by using cold fluids.

[Printed, 1*s.* 4*d.*]

A.D. 1855, January 11.—N° 77.

THOMAS, William Lynall.—"Improvements in projectiles "and gun wads."—(Provisional Protection only.)

A conoidal bullet is proposed to be made with a hollow in its rear, into which a plug is forced; the plug is to be attached to a wad of papier maché, or other material. Bullets fired from a smooth bore are to be provided with wings to give rotation.

[Printed, 3*d.*]

A.D. 1855, January 12.—N° 87.

PRESTON, Francis.—"Improvements in ordnance and in "projectiles for ordnance and small arms."

Cannon are bored through or cast with a hole of small diameter; into the breech end is fitted an arbor, which is used to support the boring head, by which the piece is bored to the required size. The breech part is bored of a conical shape, and a conical plug is driven in and closes the bore.

Projectiles are made with grooves deep in front and slanting with decreased depth backwards, for the purpose of giving them rotation during their flight.

[Printed, 6*d.*]

A.D. 1855, January 15.—N° 104.

OMMANNEY, Henry Mortlock.—"An improvement in the "manufacture of shot, shells, hollow shot, and other projectiles." —(Provisional Protection only.)

Shot or shells are cast in usual way, and then are annealed in a suitable furnace until the metal is sufficiently decarbonized.

[Printed, 3*d.*]

A.D. 1855, January 16.—N° 108.

STEFANI, Marc Toussaint.—" Improvements in fire-arms." —(Provisional Protection only.)

A chamber is made in the barrel like that used for mortars and howitzers, but deeper, so that an open space may be left between the powder and the projectile. Grooved projectiles are to be used.

[Printed, 3*d*.]

A.D. 1855, January 16.—N° 113.

SIMKIN, James.—" Improvements in rifles and other fire-arms."—Sights.

The breech sight is raised or lowered by means of a screw or other suitable equivalent. The " point sight" at the end of the barrel is made laterally moveable by means of a screw, and has also a vertical movement.

[Printed, 5*d*.]

A.D. 1855, January 17.—N° 120.

HORTON, Joshua.—" An improvement in packing or storing " gunpowder.

Vessels made of iron coated with zinc, of a cylindrical or prismatic sectional form, are used.

The vessels made in the manner described in a former Specification of Letters Patent of December 17, 1853. (See No. 2938, p. 155.)

[Printed, 6*d*.]

A.D. 1855, January 17.—N° 123.

DAVIDSON, David.—" Improved apparatus for pointing ord-" nance and restoring the aim of the piece either by day or night " when it is once obtained." Detached collimator.

The piece of ordnance is to be correctly sighted and laid by the gunner upon a given object. A moveable telescope is then placed in grooves or studs attached to it at the breech, and its cross wires are made to bear upon and coincide with a given detached object, by preference a " collimator," placed behind the piece. The exact adjustment of the telescope is then noted. In order to lay the gun again in the same position as before, the telescope is replaced upon the gun, and the gun is adjusted until the cross wires of the telescope coincide with the same detached object or collimator as before; the axis of the gun will then be in the same line as when aim was first taken by the gunner.

[Printed, 10*d.*]

A.D. 1855, January 17.—N° 125.

HIGGINSON, JAMES, and WHITWORTH, THOMAS SCHOFIELD.—"Improvements in moulding for casting shot, shells, and other articles."—(Provisional Protection only.)

The pattern used for casting the shot or shell is to be released from the sand with small risk of disturbance by making the pattern revolve. One half the pattern is attached to a plate adapted as a bottom to the mould-box; sand is rammed in, and a pinion taking into a wheel formed on the pattern plate is turned, and causes the plate to revolve. The other half of the pattern is made in like manner, and the two are to be joined together. Improved modes of ramming and smoothing are also referred to.

[Printed, 3*d.*]

A.D. 1855, January 18.—N° 134.

PARTRIDGE, HENRY, and BROOME, JOHN BENJAMIN.—"Improvements in the manufacture of wrought-iron ordnance."—(Provisional Protection only.)

Two pieces of wrought iron are to be forged into the proper semi-circular form, and placed together upon a mandril, so as to approximate in shape, when so joined, to a cannon. The two pieces are then to be welded by passing them between large rollers which have taper grooves, and by one revolution pass over and weld the two pieces throughout their length, so as to form a taper barrel.

[Printed, 3*d.*]

A.D. 1855, January 18.—N° 139.

LAURIE, JAMES GRAY.—"Improvements in the sights of fire-"arms and cannon."—(Provisional Protection only.)

It was proposed to use a sight with an adjustable aperture or hole, so that when a decreased aperture is used, it shows that the object is proportionally more distant.

Sights may be fixed on one side of the piece.

[Printed, 3*d.*]

A.D. 1855, January 20.—N° 157.

PEARCE, William Gore.—" An improved method of projecting chain or coupled shot or shell from double and single barrel guns, and causing them to explode simultaneously by electricity and other means."—(Provisional Protection only.)

A double gun is used; it is cast solid, and has two barrels connected at the breech, and set at an angle to one another. The shot are connected by a chain, and are to be fired simultaneously one from each barrel.

[Printed, *3d.*]

A.D. 1855, January 23.—N° 173.

PRINCE, Frederic.—" Improvements in cartridges for fire-arms."

Cartridges are made with paper prepared somewhat like guncotton by using sulphuric and nitric acids, or in some way which will cause the paper to be entirely consumed in the barrel, without rendering it explosive by percussion.

[Printed, *3d.*]

A.D. 1855, January 25.—N° 193.

BURSELL, George Henry.—" Improvements in cases or coverings for explosive substances or compounds."—Cartridges. —(Provisional Protection only.)

Waterproof paper or other material is proposed to be used for making the cartridges.

Two sheets of paper, with the waterproof mixture between them, are fastened together, or sheets are singly covered or impregnated with caoutchouc, gutta percha, asphaltum, or varnish.

[Printed, *3d.*]

A.D. 1855, January 26.—N° 198.

BEALES, WILLIAM.—" Improvements in cartridges."—(Provisional Protection only.)

The Provisional Specification states that the invention consists in using oiled paper or fabric, containing oil enough to make the substances waterproof, and also to grease the barrels. The paper may be covered with flock on the outside. A disc or ring is inserted in the base of the cartridge, by which means the bottom may be torn off.

[Printed, *3d.*]

A.D. 1855, January 26.—N° 205.

MALLET, Roberts.—" Improvements in the manufacture of " hollow shot and shells, &c." Casting.

Cast or wrought-iron cores, consisting of two thin hemispheres, joined together, are used as cores instead of sand for casting hollow projectiles. The thin hemispheres remain as a lining; two bosses are made, one on the outside, which is tapped to receive the fuse, the other opposite and inside is tapped to receive a hollow taper core bar, which allows the gases to escape, and is moveable.

[Printed, 1*s*. 1*d*.]

A.D. 1855, January 27.—N° 210.

DAVIS, Elias.—" Improvements in rendering paper waterproof." Cartridges.—(Provisional Protection only.)

Suitable spirits or oils are to be supplied to thin sheets of paper, which are subsequently stoved, rolled, and pressed, and may be used for cartridges.

Two parts india-rubber, one part gutta percha, and two parts rectified spirits from the solution recommended.

[Printed, 3*d*.]

A.D. 1855, January 27.—N° 213.

LENOIR, Auguste Leopold.—" Improvements in breech-loading fire-arms."

A hinged breech piece is used for closing the breech; when it is turned up to admit the cartridge it presses a flat spring, which is provided with a hammer; the hammer is thereby cocked ready to strike a fulminating part of the cartridge, contained in a tube, specially constructed to give a central fire.

Cartridges are made with a needle fixed in them centrally; when the needle is struck it ignites a fulminating patch placed centrally between the powder and ball. The cartridge blank is withdrawn by the needle.

[Printed, 9*d*.]

A.D. 1855, January 31.—N° 241.

HARRINGTON, Josiah.—" Improvements in priming fire-arms." Self primer.—(Provisional Protection only.)

It is proposed to make the trigger-guard moveable; a link attached to it moves a lever connected with a sliding cap-holder, which is guided in grooves on the under side of a hinged plate. The action of the guard is thereby made to place a cap on the nipple.

[Printed, 3*d.*]

A.D. 1855, February 1.—N° 245.

PRINCE, ALEXANDER.—" Improvements in fire-arms." Self-capping apparatus.—A communication.

A channel or chamber is made in the stock to receive the caps. It is provided with self-acting apparatus so constructed that the action of cocking causes a cap-holder to receive and place a cap upon the nipple, and then retire back ready to receive another cap.

[Printed, 7*d.*]

A.D. 1855, February 2.—N° 248.

GOODFELLOW, BENJAMIN.—" Improvements in ordnance." Ordnance made in parts.

The weight of ordnance is to be increased so as to diminish the recoil. Cannon may be made in parts or lengths fastened or bolted together, one or all of which may be made of wrought iron. A tube or bush of steel may be inserted inside the piece. The powder is ignited at two or more places from a compound touch-hole, which has several diverging channels.

[Printed, 7*d.*]

A.D. 1855, February 3.—N° 256.

MARY'ON, ROBERT JAMES.—" Improvements in the construction of and manufacture of bullets or shot or projectiles."

The projectile has curvilinear inclined planes formed thereon of a wedge shape, and having as much of the turn of a screw as may be advisable.

This " wedge-screwed " projectile is fired with a wad made of elastic packing, or with a shoe; or a hard metal cylinder may be cased in a soft metal coating.

[Printed, 11*d.*]

A.D. 1855, February 3.—N° 262.

BISSHOPP, Edward Cecil.—"Improvements in breech-loading "fire-arms."—(Provisional Protection only.)

It is proposed to connect the barrel, which is bored throughout, with a breech-holder, in which a moveable breech-piece works with a lateral oscillating motion. The nipple is to be formed on the breech-piece.

[Printed, 3*d.*]

A.D. 1855, February 6.—N° 283.

AUDEMARS, George.—"Improvements in obtaining and "treating vegetable fibres." Explosive compound.

The bark from mulberry and other trees of the morus genus is stripped off, boiled with carbonate of soda, and afterwards with a solution of soap; it is then washed in hot water acidulated with nitric acid, and is dried by pressure.

The fibre is next soaked in a mixture of ammonia and alcohol and bleached with chloride of lime. The fibre thus obtained may be hackled, carded, and spun like cotton, and be treated with nitric acid and converted into an explosive compound resembling gun cotton.

[Printed, 3*d.*]

A.D. 1855, February 7.—N° 292.

HOFFSTAEDT, Augustus Johann, and BLACKWELL, Samuel.—"An improvement in powder-flasks and shot-belts or "pouches."—(Provisional Protection only.)

It is proposed to substitute for steel springs vulcanised or permanently elastic india-rubber springs for moving the slides and valves of powder-flasks, pouches, shot belts, &c.

[Printed, 3*d.*]

A.D. 1855, February 8.—N° 303.

MARY'ON, Robert James.—"Improvements in the construc- "tion of and manufacture of ordnance," &c.—(Provisional Protection only.)

It is proposed to make pieces of ordnance with two barrels connected together at the breech and having a common touch-hole. The barrels may be set at an angle to one another and be used for firing chain shot.

[Printed, 3*d.*]

A.D. 1855, February 10.—N° 315.

RUSSELL, SAMUEL.—" Improvements in projectiles for fire-arms and ordnance."—(Provisional Protection only.)

The projectiles are to be covered with gun wadding or felt in order to clean the gun-barrel and prevent it from "leading."

Hollow shot are charged with a bursting charge in connection with a solid shot, so as to increase the destructive power.

[Printed, 3*d.*]

A.D. 1855, February 15.—N° 343.

GOWER, BENJAMIN.—" Improvements in cannons and pieces of " ordnance, and in shot and projectiles," &c.

Cannon are proposed to be constructed in two parts on the revolver principle. Projectiles are made with spiral or straight channels in their peripheries, and may have leaden rings or belts on them to prevent windage.

[Printed, 8*d.*]

A.D. 1855, February 20.—N° 368.

BELLAMY, SAMUEL.—" Improvements in fire-arms and ord- " nance."—Breech loaders.—(Provisional Protection only.)

Muskets may be constructed with two or more barrels which are connected with a fixed breech in such a way that the barrels may be fired simultaneously. Ordnance may be constructed on the same principle.

[Printed, 3*d.*]

A.D. 1855, February 20.—N° 373.

BROWN, John Harcourt.—"Improvements in the construc-"tion of ball cartridges for facilitating the loading and lubricating "of fire-arms."—(Provisional Protection only.)

The projectiles are to be made with grooves to contain grease. Cartridges are to be made of paper and metal in combination, the grease being placed in a suitable receptacle connected with them.

[Printed, 3*d*.]

A.D. 1855, February 20.—N° 374.

BEAUMONT, Frederick Blackett Edward.—"Improve-"ments in fire-arms called revolvers." Lock.

The trigger is connected with the hammer in such a way that when the trigger is moved back the hammer is raised and discharged, or if the hammer should have been raised by hand, the trigger will act upon it and discharge it. When the hammer is raised either by the trigger or by hand, the breech cylinder is made to revolve by apparatus connected therewith.

[Printed, 6*d*.]

A.D. 1855, February 21.—N° 386.

PRINCE, Frederic.—"Improvements in fire-arms and ordnance." Breech loaders.

The barrel is bored through, and has a sliding motion on the stock, to or from a plug which is fixed in the stock. The end of the plug and the rear of the barrel are connected by screws, having parts thereof cut away, or by pins and bayonet slots. A recess may be made in the plug to receive the charge, also grooves for grease.

The plug may be made moveable, and have a reciprocating motion in a breech case, and be fastened by turning a lever with a locking apparatus. This arrangement is suited for ordnance.

[Printed, 10*d*.]

A.D. 1855, February 23.—N° 400.

NORTON, John.—"Improvements in the construction of cartridges for fire-arms."

The cartridge is made of thin paper. A small quantity of gun cotton or fulminating powder is first placed in the cartridge, then the charge of powder, then the ball. The flash from the cap will readily ignite the gun cotton, without the paper being broken.

[Printed, 6*d*.]

A.D. 1855, February 27.—N° 431.

BLAKELY, Alexander Theophilus.—"Improvements in ordnance." Strengthening guns by hoops and coils.

The gun is made with an internal tube or cylinder of cast iron or steel, which is surrounded by a casing of wrought-iron or steel, in the form of a tube, or rings may be shrunk on in one or more layers, or coils of wire or rods may be wound spirally round the cylinder. Heavy ordnance may be made of a cast internal cylinder, bored in the usual way, on which are cast rings of iron in one or more layers, which "break band."

Old guns may be strengthened by applying external rings or coils of wire or rods. The apparatus is described for breaking the recoil of guns, by means of pistons acting on compressed fluids.

When guns are made of different layers of metal, lead or other soft metal in sheets may be interposed between the layers.

[Printed, 1*s*. 4*d*.]

A.D. 1855, February 28.—N° 442.

GOODE, Benjamin William, and BROGH, Nehemiah.—"A new or improved fire-arm." Breech-loader.—(Provisional Protection only.)

It is proposed to employ a moveable breech piece, which turns sideways on a pin, which is parallel to the axis of the bore. The charge is introduced into the chamber and pushed into the barrel, which is then closed by the hinged breech piece.

[Printed, 5*d*.]

A.D. 1855, March 1.—N° 456.

KENNEDY, Thomas.—"Improvements in wadding for fire-"arms."—(Provisional Protection only.)

The wadding is made of some elastic soft substance, made into a cup-like shape. The end of the projectile is fitted into the cap, which is formed of two separate pieces, tied together in such a way that they become separated when the bullet issues from the muzzle of the piece.

[Printed, 3*d*.]

A.D. 1855, March 2.—N° 468.

CONEY, John.—"An improved construction of gun-lock."

The sear is connected with the main-spring by a link, and also with the hammer by a pin, so that both move together under the action of the main-spring.

The sear has suitable retaining notches formed in it. At half-cock the trigger is out of reach of the sear, so that if it be accidentally pulled it will not act upon it.

[Printed, 5*d.*]

A.D. 1855, March 3.—N° 479.

CARTER, Timothy Walker.—"New and useful improvements "in repeating fire-arms."

The trigger, hammer, and apparatus for turning the breech cylinder are so combined, "that by a single pull on and during the "back movement of the trigger the hammer shall be discharged, "and the cylinder subsequently rotated."

The drawings should be referred to.

[Printed, 9*d.*]

A.D. 1855, March 5.—N° 486.

HOTCHKISS, Andrew.—"Improvements in projectiles." Rifle projectiles for ordnance.

The projectiles are made cylindro-conoidal in shape, and have at their base a leaden or other soft metal ring. Behind this is a cap with a bevilled edge in front. The explosion drives forward the cap on the projectile, and forces the bevilled edge of the cap under the ring, and by expanding the soft metal presses it into the grooves of a rifled cannon.

[Printed, 7*d.*]

A.D. 1855, March 5.—N° 487.

BROOMAN, Richard Archibald.—"Improvements in pro-"jectiles."—A communication.

Projectiles intended to be fired from smooth bored barrels are made with spiral channels inside them, so that the air rushing through may cause rotation on the principle of a turbine wheel.

Percussion-shells are described.

[Printed, 9d.]

A.D. 1855, March 6.—N° 496.

PARSONS, PERCEVAL MOSES.—"Improvements in fire-arms "and projectiles."—(Provisional Protection only.)

The bores of rifles are to be made of a shape, "the section of "which would be described by a revolution of a volute or spiral or "similar curve, having its ends joined by a radial line."

Large pieces of ordnance and other fire-arms are made by coiling bars of wrought iron or steel round a central tube and welding them; or they may be cast with the bore in them, and the external surface may be chilled or hardened.

Projectiles are made of a spiral shape, and are to be covered with an elastic coil, which expands and fills the bore.

[Printed, 3*d.*]

A.D. 1855, March 6.—N° 497.

BOWLSBY, GEORGE WASHINGTON.—"An improvement in "closing the windage when discharging cannon."—(Provisional Protection only.)

It is proposed to employ a wad of soft and non-elastic metal, placed between the powder and projectile. When the projectile is rammed down it expands the soft metal wad and fills up the bore.

[Printed, 3*d.*]

A.D. 1855, March 7.—N° 503.

HIGGINS, JAMES, and WHITWORTH, THOMAS SCHOFIELD.—"Improvements in the manufacture of small arms."—(Provisional Protection only.)

Self-acting machinery is to be used for making bands for muskets. Proper lengths of metal are severed from a long piece and form the bands; the two ends are bent round and joined with scarfed or half-lapped joints.

The interiors of the bands are finished by two cutters mounted on spindles, which may be fixed at any required distance apart. Bayonet-cocking rings are similarly made. Bayonets, swords, &c. are fixed in a moveable frame, and hardened by being immersed in a suitable fluid.

[Printed, 3*d.*]

A.D. 1855, March 7.—No. 508.

NAPIER, James Murdoch.—"Improvements in machinery for "manufacturing balls or projectiles for small arms." Presses and dies.—(Provisional Protection only.)

It is proposed to construct a self-acting machine for making bullets, with two dies, one of which roughly shapes and the other finishes the bullet. The lead is cut off from a long cylinder in suitable lengths.

[Printed, 3*d.*]

A.D. 1855, March 8.—N° 513.

REITHEIMER, Gustav Charles.—"Improvements in the "means of loading or discharging fire-arms." Cartridges.—(Provisional Protection only.)

The cartridge is made up with the cap attached to it by a small piece of wire in such a way that, when the cap is separated from the cartridge, the end of it is torn off, and the cartridge is ready to be discharged.

[Printed, 3*d.*]

A.D. 1855, March 8.—N° 522.

NORTON, John.—"Improvements in fire-arms and ammuni-"tion." Igniting charge from the muzzle.

Heavy ordnance and other fire-arms are ignited by means of a "vesuvian" or other match, which is connected with a spring movement fixed at the muzzle of the piece. A shower of sparks is to be thereby directed down the bore, which ignites loose grains of powder and fires the charge from the front.

[Printed, 6*d.*]

A.D. 1855, March 10.—N° 543.

HUGHES, John.—"An improvement in bushing the touch-holes "of cannon."—(Provisional Protection only.)

Touch-holes of cannon are to be recessed, and a female-screw cut therein. Into this is screwed a cylinder, of steel or other suitable metal, to form the vent, which may be removed by unscrewing it.

[Printed, 3*d.*]

A.D. 1855, March 14.—N° 564.

COOKE, Richard Campbell Green.—" Improvements in " military and other cloaks."—(Provisional Protection only.)

The cloak is to be made eight or nine feet long, about five feet wide, with a hole cut in the middle for the head. Suitable loops are attached thereto, so that it will, if requisite, serve as a kind of tent.

[Printed, 3*d.*]

A.D. 1855, March 14.—N° 569.

KIDDER, John.—"Improvements in the construction of castors." Suitable for gun carriages.

The castor consists of a ball working in a socket formed by turning or casting it with a flat internal surface at the top which rests on the ball. The ball is somewhat smaller than the socket, and is confined therein by narrowing the sides of the socket or in any other suitable way.

[Printed, 3*d.*]

A.D. 1855, March 14.—N° 578.

WRIGHT, Richard.—" An improvement in the construction of swords."—(Provisional Protection only.)

The handle of the sword is made cylindrical in shape, and pistol barrels are attached thereto in such a manner that the finger, while holding the sword, may discharge the barrels.

[Printed, 3*d.*]

A.D. 1855, March 17.—N° 604.

BRITTEN, Bashley.—" Improvements in projectiles."—(Provisional Protection only.)

The projectiles are of iron and of an elongated shape, with a hollow space formed in their rear ends, so as to throw the centre of gravity forward. A belt of soft metal is united to the iron by zinc or tin solder, and is expanded by the explosion, so as to fill up rifle grooves. The hollow space in the projectile may be filled with a bursting charge.

[Printed, 3*d.*]

A.D. 1855, March 24.—N° 654.

GRIFFITH, George Lewis, C.B., and GURNEY, Joseph.— "An improved construction of knapsack, convertible, when required, into a bed, a litter, or a tent."

The knapsack is made of deodorised india-rubber cloth, made to fold and buckle together, so as to answer for a knapsack, while, at the same time, it may be unfolded and spread out, and answer as a blanket or tent covering.

[Printed, 6*d.*]

A.D. 1855, March 26.—N° 669.

BURNHAM, Oliver, R.—" Improvements in the construction " of projectiles."—(Provisional Protection only.)

A band of soft metal is attached to the projectile to prevent windage and fill the rifle grooves.

Spiral channels may be made in the projectile to give it rotation during its flight.

[Printed, 3*d.*]

A.D. 1855, March 28.—N° 688.

BECKER, Ernest Hannibal.—" A new or improved projectile."—(Provisional Protection only.)

A leaden ring is attached to the projectile and annular wedges are driven under it, and so cause expansion and prevent windage.

[Printed, 3*d.*]

A.D. 1855, April 2.—N° 728.

TIMMERHANS, Adolphe Emile Lambert Charles.— " Forcing [forming] projectiles applicable to artillery as well as to portable fire-arms."—(Provisional Protection only.)

The rear end of the projectile is made to taper, and a shoe or cup-shaded wad of suitable material is employed. The wad is driven forward on the taper end of the projectile, and so fills up the bore.

[Printed, 5*d.*]

A.D. 1855, April 3.—N° 747.

COWEN, James, and SWEETLONG, James.—" A locomotive " land battery."—(Provisional Protection only.)

A massive framing is proposed to be fixed on five broad wheels. Upon this framing ordnance is mounted, and loop-holes may be made in the sides thereof for riflemen. The carriage is to be driven by a steam-engine.

[Printed, 3*d.*]

A.D. 1855, April 3.—N° 749.

JOYCE, Frederick.—" Improvements in the manufacture of " percussion caps and other primers." Waterproof caps.

Azotised or oxygenated vegetable matters, of the nature of guncotton, are used as a covering for the fulminating composition employed for caps or primers, and render the same waterproof.

[Printed, 3*d.*]

A.D. 1855, April 5.—N° 760.

BRAZIER, Joseph.—" Improvements in revolving or repeating " fire-arms." Ramrods.

The ramrod slides in guides at the side of the barrel. It is actuated by a lever, connected by a pin to the side of the barrel. The short arm of the lever has a curved slot, in which a button or pin attached to the ramrod works; so that the up and down motion of the long arm of the lever gives a reciprocating motion to the ramrod.

[Printed, 7*d.*]

A.D. 1855, April 9.—N° 780.

O'CALLAGHAN, Edward.—" Improvements in ordnance and " in projectiles applicable to ordnance and small arms." Elevating screw, projectiles.

An elevating screw is so arranged that when the gun has attained the greatest possible elevation by the direct action of the screw, while it depresses the breech, the end of the screw passes below the adjusting nut, and by reversing its action still further depresses the breech and elevates the muzzle.

Shells for small arms are made by placing a thin interior shell of suitable shape and metal within the mould, and pouring lead around it. The interior shell is filled with a bursting charge, which is made to ignite on the percussion principle.

[Printed, 6*d*.]

A.D. 1855, April 11.—N° 793.

ADDISON, JOHN, and SINCLAIR, DUNCAN.—" Improvements " in the manufacture of bayonet scabbards, sword scabbards, " pistol cases, and holsters."—(Provisional Protection only.)

Instead of using leather, it is proposed to make the articles of gutta percha, without seams, by moulding them into the required forms.

[Printed, 3*d*.]

A.D. 1855, April 12.—N° 812.

TERRY, WILLIAM.—" Improvements appertaining to breech- " loading fire-arms." Nipples, cartridges.

The improvements are stated to be specially applicable to the fire-arm described in the Specification of Letters Patent granted to Richard Brand, August 11, 1833. (See Patent N° 1870, p. 146.)

To insure the flash of the cap acting directly and with certainty on the cartridge in breech-loading arms, the nipple is made with a conical hole, the apex pointing downwards, and the channel from the nipple to the charge is made in a line directed to the centre of the bore. Cartridges are described in which a conical bullet, with a hollow hemispherical base, is employed. It may be enclosed in two or three folds of paper, which are readily pierced by the flash of the cap. A disc of paper is attached to the back of the cartridge, and behind this a wad is placed, which is left in the piece after the discharge.

[Printed, 7*d*.]

A.D. 1855, April 14.—N° 829.

KENNEDY, THOMAS.—" Improvements in shot or projectiles." —(Provisional Protection only.)

It is proposed to make the rear portion of the cylindro-conoidal projectile hollow, and to fit into the hollow part feathers or vanes connected with an india-rubber or other elastic spring. The feathers expand when the projectile issues from the piece, and are intended to give rotation.

[Printed, 3*d*.]

A.D. 1855, April 17.—N° 844.

FRAPELEG, Charles.—" Improvements in the construction of " tompions for cannon," &c.

A plug of india-rubber or other elastic material is used. Inside the plug works a screw, so that by turning the screw when the plug or tompion is inserted in the piece, its diameter is enlarged and a tight fit is obtained.

[Printed, 5*d.*]

A.D. 1855, April 19.—N° 875.

JOHNSON, John Henry.—" Improvements in the manufac- " ture of articles of hard india-rubber or gutta-percha," &c.—A communication. Sword handles, cartouch boxes, &c.

India-rubber or gutta-percha may be moulded by pressure into the required shape, to form sword handles, cartouch boxes, &c. The substance is then hardened by the well-known vulcanising process.

[Printed, 4*d.*]

A.D. 1855, April 23.—N° 903.

WHITWORTH, Joseph.—" Improvements in ordnance fire-arms, " projectiles, and machinery for the manufacture thereof." Breech-loaders, shaped projectiles, boring and rifling machinery.

The breech-loading apparatus consists of a moveable breech-piece, oscillating on a pin, and having two chambers, which, by a reciprocating action, can be alternately moved by hand opposite the rear end of the barrel.

Projectiles are described which are specially suited to the patentee's rifle system. (See Patent, N° 2525, page 187), they are made to fit mechanically the hexagonal or other polygonal bore with which they are intended to be used. They are elongated and taper at the front end, and the parts which bear upon the inside of the barrel have a spiral hexagonal shape corresponding with that of the bore.

Self-acting machinery for boring, turning, and rifling barrels is described, with the aid of drawings which should be referred to.

[Printed, 2*s.* 8*d.*]

A.D. 1855, April 24.—Nº 911.

RICHARDS, William Westley.—"Improvements in repeating "or revolving fire-arms." Locks, &c.

The mechanism of the ordinary gun lock is applied to revolvers, with certain modifications. A plate and frame, with wooden side pieces, form the stock and contain the lock. Upon the tumbler are placed the lever and stop for urging forward and holding the revolving breech.

The trigger and sear are made of the form suited to the stock, as described.

[Printed, 6*d*.]

A.D. 1852, April 24.—Nº 918.

JORDAN, Charles.—"An improvement in discharging cannon." —(Provisional Protection only.)

It is proposed to apply to the touch-hole of a cannon a plug with a recess to receive a red hot shot; on turning the plug the shot falls and discharges the piece.

[Printed, 3*d*.]

A.D. 1855, April 26.—Nº 946.

SHEARS, William.—"An improvement in cases or magazines "for gunpowder or other explosive preparations or compounds." Six-sided or other shaped cases are made of suitable metal, as tin, or its alloys, and are provided with straps or bands of copper or brass to give them strength.

[Printed, 5*d*.]

A.D. 1855, April 27.—Nº 948.

COIGNET, Robert Paul.—"Improvements for rendering tissues "waterproof." Military clothing and accoutrements.

A composition of oils, resins, amber earth, litharge, and alum, is applied to cloth, and renders it suitable for military clothing, tents, &c.

[Printed, 3*d*.]

A.D. 1855, April 27.—Nº 951.

PAGE, Thomas.—"Improvements in ordnance." Touch-holes.

In order to insure the complete ignition of the charge of gunpowder, two or more touch-holes are formed in the chamber of the piece. The priming at the different touch-holes is fired simultaneously by any suitable means, and ignites the charge at different points at the same instant of time.

[Printed, 5*d.*]

A.D. 1855, April 28.—N° 960.

PACKMAN, Frank James Wilson.—" Improvements in pro-" jectiles, in projectile instruments, and in the means of charging " the same." Shells.

Hollow projectiles are charged with highly compressed air or explosive gases, or both combined. Electricity may be used as a discharging agent. The shells may be coated inside with ferrocyanide of potassium. Air guns are described, having a hydraulic pump and a liquid reservoir to maintain the requisite pressure.

[Printed, 1*s.* 4*d.*]

A.D. 1855, May 8.—N° 1024.

MINIÉ, Charles Claude Etienne.—" Improvements in " muskets or portable fire-arms." Stocks. Locks.

The Specification and drawings describe a stock made chiefly of iron, the butt end is of wood.

The lock is of simple construction; a ram actuated by a spring is made to strike the nipple on releasing it by the direct action of a trigger. A short barrel and long stock may be employed.

[Printed, 9*d.*]

A.D. 1855, May 8.—N° 1034.

IMBS, Jules Joseph.—" Improvements in manufacturing " cartridges or cases for containing charges for fire-arms."

A cloth made of floss-silk, or silk waste, is used for making cartridges.

The silk is carded, spun, and woven into cloth, which is washed in warm water, and in a soap bath, and afterwards " hot pressed " or hot calendered." The result is a compact cloth, proof against damp.

[Printed, 3*d.*]

A.D. 1855, May 10.—Nº 1052.

SCOTT, William, and POWELL, Alfred.—" Improvements " in apparatus or machinery to be employed for the purpose of " rifling and draw-boring gun-barrels and ordnance."—(Provisional Protection only.)

It is proposed to attach the cutter used for forming rifle-grooves to a piston, having suitable guides, on which a screw is formed. The piston is made to work in a cylinder having an internal screw corresponding to that of the piston, so as to give it the requisite twist.

[Printed, 3*d*.]

A.D. 1855, May 12.—Nº 1072.

ADAMS, William Bridges.—" Improvements in the con-" struction and propulsion of vessels for navigation, moved by " internal power." Air cannon.

Among other improvements an apparatus is described for making signals by compressed air. The apparatus may be used for discharging a continuous shower of shot from a gun or air cannon.

[Printed, 11*d*.]

A.D. 1855, May 15.—Nº 1097.

JOBSON, Robert, and JOBSON, John.—" Improvements " in the manufacture of mould for casting metals." Iron bullets.

The Specification and drawings describe a series of three or more loose pattern balls or bullets, which are arranged in a series of holes in a plate, and rest loosely on another plate, or on suitable supports, so that the patterns detach themselves from the mould by their own weight, when the mould is raised by the perforated plate.

Another modification of the apparatus is described.

[Printed, 7*d*.]

A.D. 1855, May 17.—Nº 1116.

JOHNSON, William.—" Improvements in the manufacture, " treatment, and application of oily, resinous, and gummy sub-" stances, and soaps."—A communication. Military clothing.

The oily liquids obtained by distilling "common rosin," are mixed with other resinous substances, or fatty or vegetable matters, or soapy compounds, and may be combined with gutta percha or caoutchouc, and made into cloth or fabrics suitable for manufacturing military clothing, or other military accoutrements.

[Printed, 4*d*.]

A.D. 1855, May 18.—N° 1121.

MINIÉ, Charles Claude Etienne.—" Improvements in " breech-loading fire-arms." Breech-loader. Cartridges.

Breech-loading fire-arms are described in which a swivelling-piece, actuated by a lever trigger-guard, is made to draw back a sliding breech, in order to admit the cartridge. A needle apparatus is used for discharging the piece. The bullet has a recess in its rear end, in which is placed the fulminating or other charge, which is covered with a disc of gutta percha, or other material.

[Printed, 9*d*.]

A.D. 1855, May 18.—N° 1125.

GRANVILLE, William Henry Dearing.—" Improvements " in fire-arms, and cartridges for the same." Self-loading and priming fire-arms.

Chambers are formed in the stock, provided with springs and self-acting apparatus, intended to supply cartridges and percussion balls, and to load the piece as it is discharged.

[Printed, 5*d*.]

A.D. 1855, May 21.—N° 1136.

CURTIS, William Joseph.—" Improvements in aerostation," &c. Discharging projectiles from balloons.—(Provisional Protection only.)

It was proposed to construct balloons to which kites are to be attached for the purpose of discharging projectiles by means of electric currents passed through cords attached to the earth, by means of clock apparatus.

[Printed, 3*d*.]

A.D. 1855, May 22.—Nº 1152.

CRUICKSHANK, John. — "An improved construction of "offensive and defensive equipment for cavalry."

It is proposed to surround the horse with a rigid frame to which cutting edges or scythe-like projections are to be attached.

[Printed, 8*d.*]

A.D. 1855, May 24.—Nº 1167.

LONGRIDGE, James Atkinson. — "Improvements in the "construction or the manufacture of guns and artillery and of "other vessels intended to resist great pressure."

A tube, cylinder, barrel, or cannon is cast or wrought into suitable shape, and is surrounded by one or more coils of wire or rod, the end of each coil being securely fastened. The coils may be heated and welded by hydraulic or other pressure.

[Printed, 4*d.*]

A.D. 1855, May 24.—Nº 1175.

ROBBINS, Samuel Edwin.—"New and useful improvements "in fire-arms." Revolvers.

The Specification and drawings describe repeating fire-arms which have a stationary chambered magazine for containing the charges, and a moveable series of boxes or barrels turning on an axis. A hammer, which has a rotating motion, is employed in connexion with a fixed series of barrels. The hammer moves round the barrels and strikes the nipples in succession.

[Printed, 7*d.*]

A.D. 1855, May 25.—Nº 1183.

MELVILLE, Alexander.—"Improvements in breech-loading "fire-arms, and in projectiles used therewith."

A reciprocating breech-piece is used; it slides in a case attached attached to the barrel, and is connected with the barrel during discharge by a screw.

Compound projectiles made of lead and iron are employed for rifles.

[Printed, 10*d.*]

A.D. 1855, May 26.—N° 1191.

MABERLEY, FREDERICK HERBERT.—" Improvements in fire-" arms." Self-loading apparatus.

A magazine for containing cartridges is formed in the stock. The cartridges are to be attached to an endless band moving on two rollers with self-acting apparatus for charging the piece.

[Printed, 9*d.*]

A.D. 1855, May 28.—N° 1214.

BELLFORD, AUGUSTE EDOUARD LORADOUX.—" Improvements " in ordnance and in cartridges therefor."—A communication.

Breech-loading guns are mounted on carriages of an external spherical or cylindrical form and fitted into the port or embrasure in which they are worked. The gunners are thereby protected from the enemy's shot and from the smoke of the piece.

Cartridges may be made of tin or other metal plate.

A water chamber is proposed to be connected with the rear of the cartridge which is broken by the explosion, and is intended to cool and cleanse the breech.

[Printed, 7*d.*]

A.D. 1855, May 31.—N° 1237.

WHARTON, EMANUEL.—" Improvements in ordnance and fire-" arms."—(Provisional Protection only.)

It is proposed to line cannon with steel tubes to make them durable.

Gun barrels may be straightened by drawing a mandril through them when heated.

A straight steel spindle with suitable apparatus may be used for testing the straightness of barrels.

[Printed, 3*d.*]

A.D. 1855, June 4.—N° 1272.

ELEY, WILLIAM.—" An improvement in the manufacture of " detonating caps for fire-arms." Waterproof caps.

A disc of vulcanized india-rubber or other similar material is placed in the cap and covers the detonating priming and so prevents the admission of wet, while it will not prevent the flash of the cap from passing through to the nipple.

[Printed, 3*d.*]

A.D. 1855, June 5.—N° 1284.

ALLEN, Ethan.—" An improved breech-loading fire-arm."

The Specification and drawings describe a perforated cylinder turning on bearings at right angles to the axis of the bore, which exposes and closes the rear end of the barrel like a tap-plug.

The cylinder is made to break the cartridge when it is inserted.

[Printed, 1*s.* 4*d.*]

A.D. 1855, June 6.—N° 1296.

BOUCHER, John.—" Improvements in powder-flasks, and in " the sights and ramrods of fire-arms."

The powder-flask has a rotating cylinder containing several chambers, each of them being of the correct size for a charge of powder, which may be emptied and filled in succession.

The pillar of the sight folds on a hinge, and " is kept upright " by a spring ; a slide actuated by a screw is attached thereto."

The ramrod is formed of a rod of metal coated with papier maché of the requisite thickness to afford a firm hold to the hand.

[Printed, 5*d.*]

A.D. 1855, June 7.—N° 1304.

REYNOLDS, John Andrus.—" Improved machinery for dis-" charging vollies of shot."

The Specification and drawings describe a row of fixed barrels mounted in a suitable frame. A cylinder containing charge chambers is connected with the row of barrels, and by turning a handle suitable apparatus is made to load and discharge the barrels in rapid succession. Water is used to cool the chambers and barrels.

[Printed, 2*s.* 9*d.*]

A.D. 1855, June 7.—N° 1308.

PETERS, Richard.—" Improvements in the manufacture of " ordnance shells and other hollow vessels."

The shells are cast in a hollow mould made in two or more parts. The metal is introduced by a pipe into the centre of the mould, and is distributed over the interior by centrifugal action, resulting from rotatory motion being given to the mould.

[Printed, 7d.]

A.D. 1855, June 9.—N° 1323.

COLT, SAMUEL.—" An improvement in the construction of fire-" arms." Nipple.

The barrel is forged without the " lump," and is bored at the breech to receive a hollow nipple plug, which is brazed on. The end of the plug is closed by a screw, and in one side of it is inserted a cone-shaped nipple, which may be screwed in.

[Printed, 5*d.*]

A.D. 1855, June 9.—N° 1324.

COLT, SAMUEL, and ELEY, WILLIAM THOMAS.—" Improve-" ments in the manufacture of cartridges."

The bullet is cast with a rebate and an annular groove at its rear end. The powder-case is formed of sheet foil, and the caps are secured by waterproof cement. The case, when charged, is attached to the bullet by cement and pressure. A layer of grease is run round the cartridge at the junction of the powder-case and bullet.

The cartridge may be enclosed in an outer case, and a tape is attached to the rear end, by means of which it may be readily torn off.

[Printed, 5*d.*]

A.D. 1855, June 13.—N° 1346.

BAKEWELL, FREDERICK COLLIER.—" Improvements in ro-" tating breech fire-arms."

A short tube terminating in a collar is attached to a revolving breech-piece. The collar fits into " a recess in the bracket of the " barrel " and prevents fouling, and is also used for connecting and locking the breech. The hammer is raised by pulling the trigger, and may be retained at full cock by means of a moveable stud, which takes into a notch in the hammer, or it may be discharged at once.

A double spring, or a spring lever and spring, may be applied to the trigger instead of a strong single spring.

The rotating breech is locked by means of a bolt acting in combination with a cam shoulder on the trigger and a hexagonal or polygonal neck on the rotating breech.

A self-acting saftey bolt is attached to the guard-plate.

[Printed, 8*d.*]

A.D. 1855, June 14.—N° 1358.

HOLLIS, Ebenezer.—" A new or improved method of securing " ramrods to fire-arms."

A spring and roller attached to the stock underneath the barrel are used to retain the ramrod in its place by pressure.

[Printed, 6*d.*]

A.D. 1855, June 14.—N° 1359.

ENOUY, Joseph.—" The means of removal of every rotary or " revolving barrel or cylinder containing chambers from all revolver " pistols, guns, and fire-arms, and the substitution in their place " by another and other barrels or cylinders in succession."

Two or more revolving breech-pieces are connected in a frame attached to the stock in such a manner that when the charges in the chambers of one breech-piece have all been fired, the breech-piece may then be removed and others ready charged be successively substituted in its place.

[Printed, 7*d.*]

A.D. 1855, June 18.—N° 1386.

BESSEMER, Henry.—" Improvements in the manufacture of " ordnance."

Pieces of ordnance are cast in steel with their trunnions attached in moulds formed in dry loam, heated to a low red heat before the metal is run in.

When the casting has solidified it is placed in sand and allowed to cool slowly, or it is annealed in a suitable oven.

The outer portion of the metal may be decarbonised by admitting air, or by embedding the casting in oxide of iron or manganese in iron ore.

[Printed, 4*d.*]

A D. 1855, June 19.—N° 1398.

MACINTOSH, John.—" Improvements in fuses, fusees, and matches."

Fuses that ignite by friction are made with a piece of wire fixed in the head or igniting end, which prevents the composition from being broken off by the act of rubbing.

Phosphorus paste spread on cardboard and covered with shellac will produce a fuse which will not be extinguished by the wind.

[Printed, 3d.]

A.D. 1855, June 19.—N° 1399.

GOVER, DANIEL.—" Improvements in the construction of gun-" carriages and appliances connected therewith."

"A central frame" is adapted to the gun, on which it is supported by means of a centre pin. The breech end is adjusted vertically by means of a screw, which has its bearing in a traversing segmental block, provided with anti-friction wheels, and traversing on " an annular tramway " attached to the central frame. The gun may be turned in any direction or completely round without moving the carriage. It may be thus loaded from the rear; shields placed at an angle may be used for protecting the gunners.

[Printed, 10*d.*]

A.D. 1855, June 22.—N° 1436.

BELLFORD, AUGUSTE EDOUARD LORADOUX.—" Improve-" ments in breech-loading fire-arms and cartridges relating thereto." Needle breech-loading arms.—A communication. — (Provisional Protection only.)

The Provisional Specification, with drawings, describes a needle gun, which has a self-acting magazine in its stock for containing and supplying cartridges.

[Printed, 8*d.*]

A.D. 1855, June 23.—N° 1441.

WALKER, THOMAS.—" Improvements in projectiles for ordnance " and other fire-arms."

Projectiles are made with vanes or grooves, which have an inclination not greater than the distance between the edges of contiguous grooves. With the projectile a wad or shoe is used.

Rotation may be given to the projectile by means of the back fire of rocket composition burned in angular channels formed in its interior.

[Printed, 6*d.*]

A.D. 1855, June 28.—N° 1475.

DAVEY, SIMON.—" An improvement in the manufacture of " safety fuses for mining and military purposes."

A thread saturated with some inflammable preparation, such as is described in the Specification of former Letters Patent of April 15, 1852 (see Patent, No. 14,065, p. 122), is inserted in the centre of the fuses. The fuses may be coated with waterproof mixtures.

[Printed, 10*d.*]

A.D. 1855, June 28.—N° 1476.

ENGSTROM, Carl Christian.—"Improvements in breech-"loading ordnance and the balls or projectiles thrown by cannon."

In the breech end of the piece is fitted a moveable plug, which is fastened by lugs, and is removed to admit the charge. On its front end is an elastic steel ring indented to make a close joint. India-rubber bands are used to break the recoil. The carriage consists of two parts, one is attached to a ship's side or other fixed hold, and has wheels which allow a side motion, the other is moveable and recoils, the recoil is broken by the action of inclined planes.

Projectiles having short projections or ribs are intended to be used for rifled cannon, having an increasing pitch.

[Printed, 1*s.* 7*d.*]

A.D. 1855, July 9.—N° 1534.

CROSLEY, Henry.—"Improvements in projectiles," &c.

The projectiles are of the conoidal form, and may be made to contain a bursting charge in connexion with a compound which produces suffocating fumes. The charge may be ignited by fixing percussion cap on the nose of the projectile. Rotatory motion is to be given by means of grooves or wings, and windage is prevented by using belts of soft metal or fibrous materials. The flight of the projectile is to be prolonged by means of a tube affixed thereto, on the rocket principle.

[Printed, 1*s.* 6*d.*]

A.D. 1855, July 10.—N° 1542.

FLYNN, Henry Edward.—"Improvements in preventing the "evil effects of the recoil of cannon."—(Provisional Protection only.)

It is proposed to suspend the cannon or mortar from suitable framing by means of suspension bars, and to fire it in that position, so that the action of the recoil tends to raise the gun, and is counteracted by its weight.

[Printed, 3*d.*]

A.D. 1855, July 11.—N° 1552.

TREEBY, Thomas Gardener.—"Improvements in revolving "fire-arms and cannon."

An endless chain of chambers, formed by bringing them side by side, is to be used instead of the revolving chambered cylinder. The chambers are brought up to the barrel in succession. The axis of the chamber is fixed so as to be in a line with that of the barrel during the discharge.

[Printed, 10*d.*]

A.D. 1855, July 16.—N° 1590.

TAYLER, William Henry.—"Improvements in hermetically "closing canisters for holding gunpowder, &c."

A screw cap is attached to the top of the canister, its "inner "angle being lined with a gasket of vulcanized india-rubber." When the cap is screwed down, it pinches the india-rubber and makes a tight joint.

[Printed, 6*d.*]

A.D. 1855, July 19.—N° 1628.

BERTINETTI, Pietro.—"A new safety projectile."

A projectile with hemispherical ends is described; it is constructed partly of wood, and is specially adapted for carrying a rope to effect communication in the case of shipwreck. A rocket may be used connexion with the projectile.

[Printed, 9*d.*]

A.D. 1855, July 23.—N° 1669.

ROLLET, George Handson.—"Improvements in projectiles "for fire-arms."

The projectiles are conical in front and have "a cylindrical body," and the rear end shaped like a truncated cone. To the fore and rear parts of the projectile are attached rings or packings of wood or other suitable material, which fit the bore and form a kind of cradle, which is separated from the projectile when it issues from the muzzle.

[Printed, 6*d.*]

A.D. 1855, July 24.—N° 1677.

JOHNSON, JOHN HENRY.—" Improvements in breech-loading " and self-capping fire-arms, and in percussion caps or primers, " and in the mode of applying such percussion caps or primers to " fire-arms."—A communication.

The " faucet breech " is used, and the surface of the faucet is grooved or cut away, so as to free it when fouled. The nipple is attached to the faucet in such a way that the hammer cannot strike the cap, except when the faucet is in the right position. Self-acting apparatus is described for capping or priming the piece.

A series of caps or primers may be formed by punching recesses in a strip or riband of metal, and cutting away the superfluous metal, and filling the recesses with percussion compounds.

[Printed, 1*s*. 3*d*.]

A.D. 1855, July 24.—N° 1678.

JOHNSON, JOHN HENRY.—" Improvements in breech-loading " ordnance and fire-arms and in their projectiles."—A communication.

The Specification and drawings, which should be referred to, describe breech-loading apparatus, in which a slot is made in the breech of the piece transversely to the bore. The parts forming the moveable breech work in the slot; they are composed either of two wedges or a male and female screw, and are so constructed that increased pressure gives additional tightness, and compensation is made for wear.

Iron projectiles may be made in two parts; the fore part is conical, and the rear part is attached to it by a shank, on which it slides and turns. Windage is prevented by wrapping leather, felt, or fibrous materials round the projectile.

[Printed, 10*d*.]

A.D. 1855, July 26.—N° 1703.

GOODYEAR, CHARLES.—" An improvement in the manufacture " of gunpowder."—A communication.—(Provisional Protection only.)

It was proposed to employ india-rubber or gutta-percha with sulphur and saltpetre in the manufacture of gunpowder.

[Printed, 3*d*.]

A.D. 1855, July 28.—N° 1722.

KERR, JAMES.—" Improvements in revolver fire-arms." Lever ramrod.

A lever is attached by an axis to the side of the barrel, and actuates a sliding ram, which works in a guide. The lever works in a slot in the ram, and acts by means of a curved excentric surface.

[Printed, 6*d*.]

A.D. 1855, July 30.—N° 1728.

PIPER, CHARLES.—" The improvement of gun-stocks of every " description, used both for sporting and military purposes."

A projection is attached to the bottom of the stock, which is made to fit under the arm-pit of the person firing the piece, to enable him to hold it steadily. The projection may be moveable, and be made of metal or wood, covered with lead or gutta-percha.

[Printed, 3*d*.]

A.D. 1855, August 1.—N° 1739.

ROBERT, JOSEPH.—" Improvements in machinery for manu- " facturing fire-arms.

The Specification and drawings, which should be referred to, describe rifling machinery for rifling barrels with three, four, or any suitable number of grooves. Self-acting apparatus is described for regulating the depth of cut. The barrel is rifled in a horizontal position.

[Printed, 6*d*.]

A.D. 1855, August 1.—N° 1740.

BRITTEN, BASHLEY.—" Improved projectile."

The Complete Specification filed with the petition describes a hollow cast-iron cylindro-conoidal projectile. The hollow is placed in the rear of the projectile, to throw the centre of gravity forward, and place it in front of the greatest diameter. A coating or belt of lead or other soft metal is attached to the rear of the projectile. The projectile is first coated with zinc, then dipped in a suitable vessel containing the lead or soft metal. The soft metal coating expands into the grooves of a rifled barrel, and fills the bore of the piece.

[Printed, 3*d*.]

A.D. 1855, August 3.—N° 1760.

GLOVER, Frederick Robert Augustus.—" Improvements " in the means of carrying knapsacks," &c.

A pair of pads or bearers made of wood or other suitable material properly padded, are attached to knapsacks. The pads rest upon the shoulders of the soldier, and the knapsack is suspended therefrom in such a manner that its weight is borne at one or at both ends of the pads.

[Printed, 10*d.*]

A.D. 1855, August 3.—N° 1765.

JOHNSON, John Henry.—" Improvements in the manufacture " of metallic waterproof fabrics," &c., suitable for military accoutrements.—A communication.—(Provisional Protection only.)

Metallic cloth or wire gauze is used as a foundation for the cloth. It is steeped in any suitable waterproofing composition until the interstices of the cloth are filled up; it may then be coated again on one or both sides.

[Printed, 3*d.*]

A.D. 1855, August 4.—N° 1773.

HALL, Edward.—" Improvements in the manufacture of gun- " powder."

These consist in an arrangement of self-acting apparatus for moistening the charges in a powder-mill with water. Cisterns and supply pipes and self-acting valves are described, by means of which the exact quantity of water required can be sprinkled over the charges in a given time.

[Printed, 10*d.*]

A.D. 1855, August 6.—N° 1774.

MACINTOSH, John.— " Improvements in the application of " incendiary materials to be used in warfare."

Various modes of employing coal tar naphtha for warlike purposes are described. The naphtha may be discharged from boats in or upon the water, and when ignited by potassium or proper fuses, would produce dense suffocating vapours; or naphtha mixed with other materials may be used for charging shells and rockets.

[Printed, 5*d.*]

A.D. 1855, August 6.—N° 1776.

DISNEY, HENRY.—" Improvements in war projectiles." (Letters Patent were not obtained, the Law Officer having refused provisional protection.)

The Provisional Specification referred to an incendiary projectile whose contents were intended to produce spontaneous fire on being exposed to the air, and were stated to be " composed of various " combustible matters unnecessary to detail or expose."

The contents of the shell might be made to produce blindness.

The description was insufficient.

[Printed, 3*d.*]

A.D. 1855, August 8.—N° 1795.

HADDAN, JOHN COOPE.—" Improvements in the manufacture " of rifled and other cannon." Cast rifled cannon.

Cannon are cast hollow with rifled grooves formed in them, by employing a tubular metal core of the requisite external shape.

Cannon may be cast round a thin mandril which is left and forms a permanent lining to the piece.

The Specification of former Letters Patent, dated October 14, A.D. 1854, (see Patent, N° 2197, p. 178,) is referred to.

[Printed, 7*d.*]

A.D. 1855, August 11.—N° 1826.

REEVES, CHARLES EVANS.—" Improvements in the construc- " tion of repeating fire-arms." Breech-loader, locks.

The moveable breech fits into the end of the barrel, and is held in close contact therewith by the lateral pressure of a wedge hinged to the barrel and lock frame, and dropped between the rear of the moveable breech and a false breech.

To charge the piece, the wedge piece is raised, the moveable breech is made to slide back, and is raised to receive the charge; it is then depressed and pushed back into its place.

The mainspring of the lock is made to bear, through the intervention of an anti-friction roller, on the tumbler to which the hammer is attached; bearings are formed for the tumbler in the trigger plate.

[Printed, 9*d.*]

A.D. 1855, August 14.—N° 1845.

HADDAN, John Coope.—" Improvements in the manufacture " of cannon." Rifled tube linings.

An old or a new cannon may be lined with a tube of wrought iron, steel, or brass by boring it out and fitting in the tube, which may be rifled in any suitable manner. The Specification of former Letters Patent of August 8, 1855, are referred to (see N° 1795, p. 229.)

Cannon may be provided with Y or other fittings for receiving moveable telescopes or sighting tubes.

[Printed, 7*d.*]

A.D. 1855, August 16.—N° 185.

WILLIAMS, Thomas.—" Improvements in breech-loading fire- " arms, and in the mode or method of loading the same."—(Provisional Protection only.)

The trigger guard is proposed to be used as a lever for working the ramrod of a " revolver " on the rack and pinion principle.

[Printed, 3*d.*]

A.D. 1855, August 17.—N° 1870.

BROWN, David, and BROWN, Jeremiah.—" Machinery for " the manufacture of bayonets."

Rolling machinery is described, with the aid of drawings, for rolling bayonets, first in a rough taper form, and then in a triangular shape by means of three rolls. Or the triangular form may be given by placing the bayonet between a pair of dies and rolling it between two rollers.

[Printed, 7*d.*]

A.D. 1855, August 20.—N° 1887.

BROWN, John Harcourt.—" Improvements in the construc- " tion of ball cartridges for facilitating the loading and lubricating " of fire-arms."—(Provisional Protection only.)

Lubricating material is placed in a groove round the base of the bullet. The cartridge terminates above the groove, and may be enclosed in a case of metal or paper and metal.

[Printed 3*d.*]

A.D. 1855, August 23.—N° 1911.

THOMAS, WILLIAM LYNALL.—"Improvements in projectiles."

Elongated projectiles are surrounded with belts or castings of soft metal, as lead, both at their fore and rear ends. The belt at the rear end may be in the form of a cup, the projectile is thereby made to expand round the fore as well as the rear part when it is fired.

[Printed, 5*d.*]

A.D. 1855, August 27.—N° 1945.

BELLFORD, AUGUSTE EDOUARD LORADOUX.—"Improvements "in percussion guns."—A communication. Self-priming apparatus.

A tubular magazine for containing caps is attached to the stock on the right side of the barrel. A rocking primer case receives the cap from the cap tube and places it on the nipple.

[Printed, 8*d.*]

A.D. 1855, September 6.—N° 2015.

GODDARD, SAMUEL ASPINWALL.—"A new or improved method "of preventing the injurious fouling of the barrels of fire-arms and "of cleaning the same when fouled."—(Provisional Protection only.)

A short metal tube of the same diameter as the barrel to be cleaned is introduced therein. The bottom of the tube is closed with a wad, and it is filled with tow impregnated with soft soap; the top is closed with a wad, and caps may be placed on the ends of the tube, which are removed when it is to be used.

The piece is charged with powder and the tube and a projectile. It is fired, and the contents of the tube being forced out, are made to clean the barrel.

[Printed, 3*d.*]

A.D. 1855, September 6.—N° 2017.

ASTON, CHRISTOPHER PENRHYN.—"Improvements in breech-"loading arms." Breech-loader.

A bolt or solid piece is welded or brazed to the barrel near the breech end, and passes through a bed on which the barrel is swivelled, and is there locked, and so takes off the shock of the recoil.

A conical plug is adapted to the breech end of the barrel; it is attached to a rod or lever centred on a pin in the bolt or solid piece. The plug stops the rear of the barrel during discharge, and is drawn back by means of the lever by hand when the piece charged.

[Printed, 9*d.*]

A.D. 1855, September 6.—N° 2018.

PRYSE, Charles, and CASHMORE, Paul.—" Improvements " in repeating fire-arms." Locks, ramrod, safety bolt.

Locks are described having a double action, so that they may be either cocked by hand or by the action of the trigger.

A lever ramrod is employed, in which the plunger is pinned to the fulcrum of the lever handle by a link.

A double-acting bolt is used to secure the hammer at half-cock, and also prevent the cylinder breech-piece from revolving.

[Printed, 1*s.* 4*d.*]

A.D. 1855, September 7.—N° 2024.

BROOMAN, Richard Archibald.—" An improvement in " casting mortars, cannon, and other hollow articles."—A communication.

The cooling of the metal is equalized by forming the mould of a composition of loam or other material, encased in anhydrous gypsum, and employing an outer casing, which is a non-conductor of heat.

The core is made of loam and gypsum, a tube is attached thereto through which water is forced, or a current of air may be substituted.

[Printed, 6*d.*]

A.D. 1855, September 8.—N° 2032.

FEATHER, Robert Barnard.—" Improvements in the make " and construction of shells and balls to be used with cannon or " other artillery or fire-arms."

Projectiles are made in parts, which may be screwed together. he point may be armed with spikes. Longitudinal bars may be ttached to the projectile, and combinations of metals, as iron and ad, are used.

[Printed 4*d.*]

A.D. 1855, September 13.—N° 2067.

LUCENAY, Pierre Bernardet de.—"Improvements in the "batteries of guns and pistols." Locks.

The Specification and drawings describe a lock, in which the hammer is attached directly to the mainspring (which is straight, and is placed horizontally on the top of the lock frame), or is actuated directly by it. Only a few parts are required in constructing the lock.

[Printed, 9*d*.]

A.D. 1855, September 13.—N° 2069.

BLISSETT, John.—"Improvements in the construction of re- "volving chamber fire-arms." Ramrods.—(Provisional Protection only.)

The lever is of the second order. The fulcrum is attached to the fore end of it, and has a projecting lug connected by a short link to a sliding rammer.

[Printed, 3*d*.]

A.D. 1855, September 14.—N° 2074.

CHURCH, William.—"Improvements in mounting and adjust- "ing ordnance and other fire-arms."

The gun-carriage is mounted on a railway, along which it moves freely, while it is prevented from rising by projecting pieces of angle iron engaged under the rails. A series of bands of vulcanized india-rubber connect the carriage to the platform, and are used for breaking the recoil. A telescope screw is used for adjusting the piece.

A series of barrels may be mounted on a frame with adjusting apparatus, so that they may be pointed singly or altogether.

[Printed, 10*d*.]

A.D. 1855, September 20.—N° 2119.

PAGE, John, and ROBERTSON, William.—"Improvements "in moulding or shaping metals." Casting projectiles.

The Specification and drawings, which should be referred to, describe self-acting apparatus for moulding projectiles, which combines a cutting or scraping-out action and a stamping motion.

[Printed, 1*s*. 3*d*.]

A.D. 1855, September 24.—N° 2135.

NEWTON, Alfred Vincent.—" An improved mode of casting " solid and hollow articles in metal." Cannon. Hollow projectiles. —A communication.

The mould is filled with molten metal in such a way that the filling and the contraction by cooling proceed simultaneously. The mould for cannon is composed of brickwork, wherein passages are made for admitting currents of air and for introducing the molten metal from an elevated reservoir, under a pressure which insures the filling up of the mould as the metal contracts during the operation of cooling.

[Printed, 10*d.*]

A.D. 1855, September 26.—N° 2150.

DEAKIN, Thomas.—" New or improved machinery for manufac" turing bayonets, matchets, and swords."

The Specification and drawings describe stamping and punching apparatus for first forming roughly and afterwards finishing the sockets, necks, and blades of bayonets; also sword blades.

[Printed, 9*d.*]

A.D. 1855, October 1.—N° 2185.

DEMING, James Hervey.—" Improvements in the construc" tion of projectiles."—A communication.—(Provisional Protection only.)

The Provisional Specification related to a projectile having a conical hollow base, and a raised belt on the central part thereof.

[Printed, 3*d.*]

A.D. 1855, October 2.—N° 2197.

HORTON, William.—" Improvements in the breech part of " fire-arms."—(Provisional Protection only.)

It was proposed to make the nipples in such a way that all angles might be avoided in the channel forming the touch-hole. The action of the flash is thereby rendered direct.

[Printed, 3*d.*]

A.D. 1855, October 2.—N° 2201.

BOUSFIELD, George Tomlinson.—" Improvements in locks " for fire-arms." Coiled mainspring. A communication.

A coiled spring is used for throwing the hammer; one end of it is attached to the tumbler, the other to the lock-frame.

[Printed, 5*d.*]

A.D. 1855, October 3.—N° 2204.

RAMSCAR, William.—" Improvements in fire-arms; which " improvements are also applicable to cannons, and all kinds of " field pieces." Cartridge, with percussion tube. Breech-loader.

The Specification and drawings describe a fire-arm with a moveable breech worked by a lever.

Cartridges are made up with a projecting tube, containing fulminating mixture, which is intended to be struck by a hammer, and so ignite the charge.

[Printed, 1*s.* 4*d.*]

A.D. 1855, October 5.—N° 2229.

HOWELL, Joseph Bennett.—" Improvements in the manu" facture of steel castings for ordnance, and other purposes." —(Provisional Protection only.)

A bar of hot iron is to be covered with a suitable deoxydising agent, and is placed in the centre of a mould. Molten cast steel is poured round and adheres to the bar, which is afterwards bored out.

[Printed, 3*d.*]

A.D. 1855, October 6.—N° 2239.

ROGERS, William.—" Improvements in fire-arms."

Several charges may be fired from the same barrel by employing as many locks and nipples as there are charges. Thick uninflammable wads are interposed between the charges.

The barrel is case-hardened for several inches from the breech end.

[Printed, 9*d.*]

A.D. 1855, October 6.—N° 2240.]

HART, Herbert William.—“ An improved cannon for “ boats.”—(Provisional Protection only.)

The Provisional Specification, with drawings, describes a l cannon, consisting of two parts, so that the barrel may be separ from the breech. Apparatus, worked by steam power, is t employed to work the gun.

[Printed, 11*d.*]

A.D. 1855. October 10.—N° 2262.

FAIRBAIRN, Thomas, FAIRBAIRN, William Andr and FAIRBAIRN, George.—“ Improvements in the mod “ method of casting ordnance,” &c.—(Provisional Protection on

Hollow maundrils of metal are used instead of cores to f the internal surfaces of chambers of guns. The maundrils ar be formed accurately to the shape of the surfaces required for castings, so that subsequent turning and boring may be dispen with.

[Printed, 3*d.*]

A.D. 1855, October 15.—N° 2302.

DODDS, Thomas Weatherburn.—“ Improvements in f “ arms and ordnance, and in the projectiles to be used therewit

The Specification and drawings describe fire-arms with sn short barrels, of sufficient size to contain the charge of pow The projectile is larger than the barrel, and has a hollow i which the powder-barrel is introduced, so that the projectile on the barrel like a cap upon its nipple. The action of powder inside the hollow is said to propel heavy projectiles t great distance.

Cast steel or iron breeches or linings are used for strengthen guns. Trunnions are attached to a moveable ring.

[Printed, 10*d.*]

A.D. 1855, October 16.—N° 2310.

CHURCH, William.—“ Improvements in the manufacture “ ordnance.”

The Specification and drawings describe a furnace for heati and welding together rings of iron or iron and steel, by passing the rings upon a mandril, and causing the mandril and rings to fall upon an anvil placed at the bottom of the furnace. The interior of the ordnance may be lined with tubes of hardened or tempered steel, or gun-metal. The breech is closed with a screwed breech-piece and soft metal washer.

[Printed, 9*d.*]

A.D. 1855, October 16.—N° 2313.

NEWTON, William Edward.—" Improvements in the con" struction of fire-arms."—A communication.

Breech-loading and self-loading apparatus. A hinged cylindrical charge chamber is connected with the breech end of the barrel, underneath which is a tubular magazine for containing cartridges. By pushing a lever trigger-guard the charge chamber is depressed, and its open mouth is made to receive a cartridge from the magazine; the charge chamber is then raised to its place, and with its cartridges closes the rear of the barrel, and is ready to be discharged.

[Printed, 9*d.*]

A.D. 1855, October 17.—N° 2325.

BESSEMER, Henry.—" Improvements in the manufacture of " ordnance and in the projectiles to be used therewith."

Malleable steel, formed by puddling refined pig iron and partially decarbonising it, is used for casting ordnance. Molten scrap iron may also be used for the same object.

Rolling machinery is employed for rolling the pieces.

Instead of trunnions jointed tension bars are used for connecting the breech end with a piece of wrought iron or steel, having a central hollow in which the gun rests, and which is bolted to the gun carriage.

Spherical trunnions may be used. Hollow cast steel projectiles are fitted with lead.

[Printed, 11*d.*]

A.D. 1855, October 17.—N° 2329.

PITMAN, John Talbot.—" An improvement in fire-arms."—A communication. Breech-loaders.

A perforated revolving plug breech is employed; it is turned by

The projectile is fired with a charge from the breech of the main tube, and, as it passes the mouths of the inclined side tubes, the several charges contained therein are to be fired at the proper time, and so gradually to accelerate the motion of the passing projectile. The pressure of the air in front of the bullet is to be removed by covering the muzzle with a covering of sheet caoutchouc, and pumping out the air by a side tube. The bullet is to be driven through the covering.

[Printed, 5*d.*]

A.D. 1855, November 7.—N° 2497.

HANSON, CHARLES.—" Improvements in fire-arms." Revolvers.

The Specification and drawings describe a lock of peculiar construction. Two motions are necessary for discharging the piece, a lever must be raised, and the trigger pulled at the same time.

A lever ramrod is used; the end of a bent lever, which is centred on a pin, takes into a slot in the ramrod, and gives it a reciprocating motion.

[Printed, 10*d.*]

A.D. 1855, November 9.—N° 2524.

BRAMWELL, JAMES, and CRAWFORD, JOHN.—" Improve-
" ments in ordnance."—(Provisional Protection only.)

It is proposed to make large pieces of ordnance of wrought iron or steel, by welding together rings having dovetail joints, so as to form a tube. Another series of rings may be shrunk on this tube.

[Printed, 3*d.*]

A.D. 1855, November 10.—N° 2529.

BENTLEY, WILLIAM HENRY.—" Improved cannon, guns, and
" other fire-arms and appendages thereto, and in the capsules,
" cartridges, and projectiles for the same and other fire-arms."

The Specifications and drawings, which should be referred to, describe a variety of apparatus intended to be applied to fire-arms, which may be loaded at the breech or at the muzzle, and have one or several barrels. Ramrods, bayonets, and musical indicators for adjusting and sighting guns are described; also pneumatic apparatus intended to make cannons float by the agency of compressed air, cartridges made of wood, clay, or glass, or metal, and projectiles having springs or rollers, are described.

[Printed, 3s. 8d.]

A.D. 1855, November 14.—N° 2560.

LAXTON, Henry.—"Improvements in fire-arms."—A communication. Breech-loaders.

A radial or hinged breech is employed; it turns upwards on a horizontal pin placed at right angles to the axis of the barrel. In the front of the breech is fitted a conical plug, which works in a tubular recess in the breech against a spring. Upon the front of the plug, which is conical, are rings of steel or other metal cut across so that they may be elastic. The rings fit tightly into the conical seat of the barrel, and when the plug is forced back by the explosion of a charge, they expand and make a close joint.

[Printed, 10*d.*]

A.D. 1855, November 15.—N° 2581.

BOUSFIELD, George Tomlinson.—"Improvements in breech-" loading fire-arms."—A communication.

A hinged breech-piece is employed; it is turned downwards on a horizontal pin placed at right angles to the axis of the bore by a lever trigger-guard. A cartridge case is made wholly or partially of soft metal, which remains in the chamber after the explosion, and is expelled or loosened from the breech-piece by the action of a sliding cone seat.

[Printed, 10*d.*]

A.D. 1855, November 16.—N° 2588.

HINKS, James, and DOWLER, Frederick.—"New or im-" proved machinery for the manufacture of percussion caps, &c." —(Provisional Protection only.)

Self-acting machinery is intended to be employed for punching blanks for caps from sheet metal, and stamping the blanks by dies into proper forms.

[Printed, 3*d.*]

A.D. 1855, November 16.—N° 2590.

PRINCE, Frederic. — "Improvements in the manufacture of " cast-iron." (Letters Patent were not obtained, the Law Officer refused provisional protection.)

The improvements were stated in the Provisional Specification to consist in combining with cast iron certain proportions of other metals (not described), to make the iron tenacious and homogeneous, and suitable for the manufacture of fire-arms.

[Printed, 3*d.*]

A.D. 1855, November 17.—N° 2594.

BALL, Henry. — "An improvement in gun sights."—(Provisional Protection only.)

It is proposed to apply to the sight "a solid top elevation," and also "a reversal of the slide spring."

[Printed, 3*d.*]

A.D. 1855, November 20.—N° 2617.

WHITEHOUSE, Edward Orange Wildman. — "Improve-" ments in electro-telegraphic apparatus, parts of which are also " applicable to other purposes." Igniting fuses of ordnance and charges in mines.

The Specification and drawings describe methods of obtaining currents of electricity by induction, which are stated to be applicable "to ordnance purposes, as well as for subterranean or " submarine blasting" operations and igniting fuses.

[Printed, 11*d.*]

A.D. 1855, November 20.—N° 2618.

PRICE, David Simpson, and NICHOLSON, Edward Chambers.—"Improvements in the manufacture of cast iron," suitable for ordnance.

Grey pig iron is melted with refined iron, technically termed "metal," "finer's metal," or "refinery metal," so that the percentage of silicon in the cast iron is lowered, while the amount of carbon therein remains about the same. The iron so produced is proposed to be employed in casting ordnance.

[Printed, 3*d.* See the Commissioners of Patents Abridgments of Specifications relating to the Manufacture of Iron and Steel, Part iv. p. 208.]

A.D. 1855, November 21.—N° 2629.

TREEBY, Thomas Wright Gardener.—"Improvements in " revolving fire-arms."—(Provisional Protection only.)

It is proposed to give the barrel a reciprocating sliding motion on the stock, and to employ a hinged breech-piece. A self-acting cap holder is to be used for placing caps upon the nipple.

[Printed, 3d.]

A.D. 1855, November 22.—N° 2,630.

TOLHAUSEN, Alexandre.—"Improvements in bombs and " other explosive projectiles whose charges are to be fired by per- " cussion."—A communication.

A sliding cap is fitted on the nose of an elongated projectile, so that when it strikes any object, the nose is driven back and ignites the charge on the percussion principle.

[Printed, 6*d.*]

A.D. 1855, November 27.—N° 2667.

NEWTON, William Edward.—" Improvements in breech- " loading fire-arms."—A communication.

The barrel of the gun has a reciprocating sliding motion in the stock, and is turned down to receive the charge, which is inserted at the breech end. A fixed cylindrical breech-pin fits the bore of the rear end of the barrel, and has an annular recess to receive the rounded edge of the barrel.

[Printed, 7*d.*]

A.D. 1855, December 3.—N° 2716.

MAYER, Christian.—" Improvements in hair trigger-locks for " fire-arms."—(Provisional Protection only.)

It is proposed to apply " a separate dog or blocking piece behind " the rear end of the sear, kept towards the same by a spring, and " this dog has the arm on it which takes the ordinary trigger."

[Printed, 3*d.*]

A.D. 1855, December 3.—N° 2718.

RICHARDS, Wesley, and COOPER, Joseph Rock.—" Im- " provements in breech-loading fire-arms."

The barrel has a sliding reciprocating motion on the stock, and when closed, its rear end is pressed against a fixed conical seat. The sliding motion is effected by levers, "having curved slots " excentric to the centre of motion." The barrel is turned on its axis sideways to receive the charge.

A barrel may be made in two parts, the fore part sliding from and towards the hind part, which contains the charge chamber. An adjusting wedge is used for adjusting the two parts and making a close joint.

[Printed, 10*d.*]

A.D. 1855, December 4.—N° 2728.

DAVOUST, JEAN.—" Improvements in cartridges."

The shot is placed in " a capsule formed of strong paper, closed " more or less at its mouth," over which a piece of thin paper is fastened. A disc of calico, packed in a hollow wooden wad, is attached to the rear of the capsule.

[Printed, 5*d.*]

A.D. 1855, December 6.—N° 2742.

HAWKER, CHARLES, and HAWKER, THOMAS PARRY.—" An " improved method of manufacturing cartridges."—(Provisional Protection only.)

Sheet gutta-percha is used instead of paper for making cartridges. A casing of muslin may be employed.

[Printed, 3*d.*]

A.D. 1855, December 6.—N° 2748.

DUNN, THOMAS.—" Improvements in fire-arms." Mortars.—(Provisional Protection only.)

Large cannon and mortars may be made by casting them and encasing the casting in coils of wire or rods of iron, steel, or other metal.

[Printed, 3*d.*]

A.D. 1855, December 13.—N° 2818.

SKELTON, GEORGE.—" An improved projectile."—(Provisional Protection only.)

It is proposed to make projectiles with " spiral grooves or convo- " luted twists on their peripheries," to give them rotation.

[Printed, 3*d.*]

A.D. 1855, December 18.—N° 2863.

NEWTON, ALFRED VINCENT.—" An improved mode of manu- " facturing wrought-iron cannon."—A communication.

A series of longtudinal bars of iron or steel are laid round a mandril; their ends rest on loose collars placed on the mandril, and a ring is slipped over them at each end. Strips or bars of iron are then coiled round the longitudinal bars, and the whole are welded together by packing the faggot so made between suitable rollers.

[Printed, 6*d.*]

A.D. 1855, December 20.—N° 2877.

SIEVIER, ROBERT WILLIAM.—" Improvements in guns and " pieces of ordnance, and the projectiles thrown from them for the " purposes of war."—(Provisional Protection only.)

It is proposed to cast cannon with hollow spaces in the outer surface, like lattice-work, so as to reduce the weight or to form cannon in parts which may be bolted together.

Projectiles with holes through them may be fired from a cannon having a bar fixed in its axis; the bar may be grooved or have spiral ribs fitting the interior to give rotation. A preparation of clay or earth may be used for vents.

[Printed, 3*d.*]

A.D. 1855, December 21.—N° 2890.

MERRITT, THOMAS EDWARD.—" Improvements in breech- " loading ordnance and fire-arms."—(Provisional Protection only.)

The invention was stated in the Provisional Specification to relate to fire-arms made with a perforated plug breech-piece.

Projectiles having both ends pointed, or having grooved peripheries, are proposed to be employed.

[Printed, 3*d.*]

A.D. 1855, December 26.—N° 2922.

SAWYER, SYLVANUS.—" An improved bombshell."

The Specification and drawings describe a shell which explodes on the percussion principle. The shell may be of iron, and is coated with lead or anti-friction metal upon tin. Wings or ribs are formed on the shell which take into the grooves of a rifled cannon.

[Printed, 11*d.*]

A.D. 1855, December 27.—N° 2928.

KRUPP, ALFRED.—" Improvements in guns and gun-carriages."

The guns described in a former Specification, dated December 17, A.D. 1852, are referred to (see Patent N° 1094, p. 133). They are made of cast steel, and are improved by providing them with a vent made of platina or copper, or other metal which will resist the action of the gunpowder. The recoil of the gun is broken by the use of vulcanized india-rubber springs connected with the carriage.

[Printed, 10*d.*]

A.D. 1855, December 27.—N° 2930.

LADMORE, Edwin.—"A new or improved method of securing "ramrods to military fire-arms."—(Provisional Protection only.)

A longitudinal groove of greater width than depth is to be made in the ramrod. About the centre of the ramrod, a stud is fixed on the barrel, which is engaged in the groove and holds the ramrod tightly in its place.

[Printed, 3*d.*]

A.D. 1855, December 28.—N° 2935.

PRESTON, Francis.—"Improvements in the construction of "military small arms."—(Provisional Protection only.)

A shoulder or groove is proposed to be made on the rammer or ramrod which acts against the band or nose piece, and holds the ramrod tightly in its place.

The band is so made as to hold and tear off the end of the cartridge.

[Printed, 3*d.*]

A.D. 1855, December 31.—N° 2952.

LILLIE, Sir John Scott.—"Improvements in guns, fire-arms, "and implements of war connected therewith." Triggers. Rests. Projectiles.

Cams connected with segments of screws or worm wheels working on spindles or shafts are substituted for triggers for discharging guns from platforms or frames, or small arms with revolving breeches.

Perforated metallic discs are used for closing the mouths of the charging chambers.

Rests are attached to fire-arms for supporting them on the left hip, or bayonets may be used for this purpose.

Felt or other elastic material is attached to projectiles, and a cylinder of paper used to contain the powder. See *ante,* p. 170.

[Printed, 3*d.*]

1856.

A.D. 1856, January 3.—N° 14.

HAINES, James.—"The deadening of sound and the prevention of vibration and concussion in connection with machinery, "gun and mortar boats, and general ordnance, and other purposes." Use of cork.

Cork alone or in combination with lead or other metal is employed for the heel of a mortar or gun-carriage, also for the stocks of fire-arms and for the beds of mortars, and various other purposes where recoil or vibration is to be deadened.

[Printed, *4d.*]

A.D. 1856, January 3.—N° 21.

JOHNSON, John Henry.—"Improvements in breech-loading "fire-arms."—A communication.—(Provisional Protection only.)

The Provisional Specification refers to a breech-loading needle-gun fitted at the breech-end, with a tube in which a tubular loading chamber is made to slide.

[Printed, *3d.*]

A.D. 1856, January 7.—N° 56.

NEWTON, Alfred Vincent.—"An improved mode of manu- "facturing rods, shafts, and tubes of iron and steel." Barrels. A communication.

A rod of iron or steel is heated red hot at one end; the rod is held at the cool end, and the heated part is twisted and hammered. The other parts are then similarly heated and twisted and hammered; the end so twisted and hammered is coiled round a mandril and welded into a gun-barrel.

[Printed, *3d.*]

A.D. 1856, January 11.—N° 84.

CLARKSON, Thomas Charles.—"A combination of certain "materials, &c. for pumps, mortar beds," &c.

Layers of wood and cork and canvas are glued or cemented together by suitable adhesive composition. The compound material may be employed for pumps or beds of mortars, gun-carriages, &c.

[Printed, *10d.*]

A.D. 1856, January 16.—N° 116.

ABRAHAM, John.—"New or improved machinery for the "manufacture of percussion caps," &c.

The Specification and drawings describe machinery for cutting out blanks for caps, and for raising them by means of self-acting stamping machinery, and so making them in the proper form.

[Printed, 10*d.*]

A.D. 1856, January 18.—N° 137.

MARSHALL, William.—"Improvements in rolling iron for the "manufacture of gun-barrels and tubes, and for other like purposes."—(Provisional Protection only.)

Skelps for making gun-barrels are proposed to be rolled by fluted rollers into a gutter or U shape. The edges of the gutter are then to be welded together to form a barrel.

[Printed, 3*d.*]

A.D. 1856, January 18.—N° 142.

MANCEAUX, Francois Jules.—"Improvements in fire-arms." Breech-loader. Sight.

The breech is closed by a sliding bolt, to which is attached a jointed or hinged handle; this, when not in use, may be folded down out of the way.

The sight consists of two parts, which together form a hinge, one is fixed on a ring fitted on the fire-arm, the other is moveable, and has in the middle a saw cut, by which it is split, but not entirely divided.

[Printed, 10*d.*]

A.D. 1856, January 21.—N° 161.

BLITTKOWSKI, Gustav Adolph.—"Improvements in repeating fire-arms." Self-charging apparatus.

The Specification and drawings, which should be referred to, describe a revolving fire-arm having self-acting charging apparatus, and a tubular magazine for containing cartridges.

The rotating breech cylinder has a reciprocating motion on its axis, and by the act of cocking the breech cylinder is drawn back and turned round, the charge is inserted, and the cap placed on the nipple. The nipples are at the back of the cylinder, each in a line with the axis of its corresponding charge chamber.

[*Printed,* 1*s.* 3*d.*]

A.D. 1856, January 24.—N° 195.

LONGRIDGE, JAMES ATKINSON.—" Improvements in the con-" struction of ordnance and other vessels intended to resist internal " pressure, and in the manufacture and method of discharging " projectiles."—(Provisional Protection only.)

Wires or rods are proposed to be coiled round pieces of ordnance in such a way that the strain increases in a definite relation to the distance of the layer of the coil from the axis of the piece. Elastic substances are to be attached to the trunnions of guns, which may be connected with a wrought iron or steel strap passing round the breech. Elastic substances may be inserted in the seat of the gun behind the charge chamber. The air between the muzzle and breech may be exhausted, so that the charge may be readily inserted.

Rockets may be fired from barrels and ignited while passing through the air.

[Printed, 3*d.*]

A.D. 1856, January 26.—N° 218.

BEASLEY, WILLIAM.—" Improvements in machinery or appa-" ratus to be employed in rifling the barrels of fire-arms and " ordnance." Cutting tools.

The cutting tool is set in a plug or tubular holder of steel, and is drawn through the barrel to form a groove; it works upon the principle of a plane. The cuttings are discharged through a bevilled slot or hole formed in the plug or holder, and pass out behind the cutter.

Several cutting tools may be mounted in a holder provided with suitable apparatus for giving it the requisite motion.

[Printed, 10*d.*]

A.D. 1856, January 30.—N° 251.

NEWTON, ALFRED VINCENT.—" An improvement in the manu-" facture of cannon."—A communication.—Hoops of wrought iron screwed on.

The cannon is cast, and on its periphery are cut screws, by means of which screwed hoops of wrought iron are fixed upon the piece in one or more layers.

The hoops may be made somewhat small, and are then expanded by heat before they are screwed upon the piece.

[Printed, 6*d.*]

A.D. 1856, February 1.—Nº 274.

PRESTON, FRANCIS.—" Improvements in machinery for shaping " and rolling metal."

The Specification and drawings, which should be referred to, describe rolling machinery for rolling bayonets, swords, &c., and giving them the requisite shapes.

The Specification of former Letters Patent, dated December 30, 1854, is referred to (see Patent Nº 2758, p. 194).

[Printed, 10*d*.]

A.D. 1856, February 1.—Nº 278.

DRAY, WILLIAM.—"An improved cartridge box and pouch." —(Provisional Protection only.)

It is proposed to make a box of leather and gutta percha containing suitable trays and cases having divisions for containing cartridges, caps, &c.

[Printed, 3*d*.]

A.D. 1856, February 6.—Nº 324.

SAUTY, CHARLES VICTOR DE.—"The prevention of the leading " or fouling of fire-arms."—(Provisional Protection only.)

It is proposed to coat projectiles by electric agency with copper, to protect them from the weather.

[Printed, 3*d*.]

A.D. 1856, February 8.—Nº 337.

RESTELL, THOMAS.—" Improvements in breech-loading and " revolving fire-arms, and in cartridges."

The Specification and drawings, which should be referred to, describe revolving fire-arms in which the trigger, which is a circular one, has a sliding motion, and by being drawn to and fro in a line parallel with the axial line of the barrel, releases the breech cylinder and turns it, and cocks the hammer.

The escape of gases is prevented by tapering off the breech end of the barrel, and applying thereon packing of vulcanized india-rubber. Cartridges are made with " a tube of metal burred down " or otherwise fixed over the neck of the bullet." A shank is cast on the bullet, which passes through the tube, and on its end is fixed a patch of detonating powder, while gunpowder is filled in the tube round the shank. The mouth of the cartridge is covered with a disk of paper prepared with nitric acid, and partaking of the nature of gun cotton. The bullet and tube may be cast in one piece.

[Printed, 1*s*. 5*d*.]

A.D. 1856, February 13.—N° 370.

NEWTON, William Edward.—" Improvements in the con-" struction of fire-arms." Breech-loaders. Revolvers. A communication.

Fire-arms which have revolving breeches, and may be discharged from the shoulder, are made with the charge chambers hinged to a revolving disc, so that they remain in a vertical position until they are raised to a horizontal one when about to be fired.

A sliding ring is used to make a close joint, and is so arranged that the piece is prevented from being charged when the ring is not in its place.

[Printed, 7*d*.]

A.D. 1856, February 21.—N° 442.

MAISSIAT, Jacques Henri Marie.—" Improvements in pro-" jectiles for fire-arms." Long projectiles.

The Specification states that the improvements are grounded on the use of long projectiles whose length is not less than two and a half times the diameter thereof.

They may be made of iron or iron coated with lead, and may be made up as percussion shells.

[Printed, 6*d*.]

A.D. 1856, February 21.—N° 446.

ENTHOVEN, Frederick.—" An improved cover for gunpowder " and other canisters and vessels."—A communication.—(Provisional Protection only.)

The lid of the vessel is to be fastened by means of lugs. A ring or packing is to be interposed between the lid, which is grooved, and the grooved lip of the vessel or canister.

[Printed, 3*d*.]

A.D. 1856, February 21.—N° 447.

GREENE, JAMES DURELL.—" An improvement in breech-loading " fire-arms."

The invention is stated to consist in an improvement upon the mode of closing the breech by the use of a self-adjusting thimble, as described in the Specification of Letters Patent dated May 12, 1854 (see Patent N° 1065, p. 164).

An annular ring or recess is formed in the rear end of the barrel, and a flange or rim is formed on the back of the thimble, which, when pressed together, form a close joint.

[Printed, 9*d.*]

A.D. 1856, February 21.—No. 451.

DENNET, CHARLES FREDERICK, and PAYS, GEORGE.—" Improvements in cartouche and percussion-cap pouches."—(Provisional Protection only.)

A tin or japanned metal box is proposed to be fitted with two compartments, one having circular cells for receiving cartridges, the other being intended to hold caps.

[Printed, 3*d.*]

A.D. 1856, February 27.—N° 501.

JENNINGS, WILLIAM HOLDEN.—" Improvements in the manu" facture of the guards and heel-plates of guns, &c."—(Provisional Protection only.)

It is proposed to use iron moulds for casting gun furniture, instead of the sand moulds usually employed.

[Printed, 3*d.*]

A.D. 1856, March 7.—N° 570.

DOWNIE, JOHN.—"Improvements in moulding or shaping metals " and other materials." Casting projectiles, ordnance, &c.

The Specification and drawings, which should be referred to, describe apparatus for moulding and casting ordnance, projectiles, and other articles, "wherein the pattern has motion given to it " during moulding, so as to effect the finishing of the moulded " surface by mechanical means, leaving nothing to be done by hand on the withdrawal of the pattern from the moulds."

[Printed, 1*s.* 5*d.*]

A.D. 1856, March 15.—N° 627.

RICE, James, and RICE, William.—"Improvements in breech-"loading repeating guns and rifles."

The charge chambers are formed in the breech cylinder at right angles to one another, and on the periphery of the cylinder a spiral groove or thread is cut, the pitch of which is so regulated that a quarter of a revolution will bring one of the charge chambers in a line with the bore of the piece.

The drawings should be referred to.

[Printed, 10*d.*]

A.D. 1856, March 20.—N° 668.

STIRLING, John Davie Morries.—"Improvements in mount-"ing heavy ordnance for naval purposes."—A communication. —(Provisional Protection only.)

It was proposed when a mortar or piece of ordnance is to be fired from a boat at a high elevation to mount it upon a cylinder which is made to float in a well formed in the boat, for the purpose of breaking the shock of the recoil.

[Printed, 3*d.*]

A.D. 1856, March 28.—N° 746.

CHARRITIE, John, and SMITH, William.—"Improvements "in the manufacture of small shot."—A communication.

Instead of the "ordinary perforated dish or cullinder" three perforated plates, accurately made and fitted, are to be used.

The holes in plates 1 and 2 being made to coincide, the metal is poured upon plate 1; plate 2 is then rapidly moved aside, and its holes are made to coincide with the holes in plate 3; at the same time the holes in plate 1 are closed. A certain portion of lead is thus allowed to fall through plate 3 every time plate 2 is moved from plate 1.

[Printed, 4*d.*]

A.D. 1856, March 29.—N° 754.

SWYNEY, John.—"Improvements in breech-loading magazine "fire-arms." Self-charging apparatus.—(Provisional Protection only.)

The Provisional Specification, with drawings, describes a fire-arm having self-acting magazines containing the charges and caps. The magazine is intended to contain about thirty cartridges, and the piece can be fired from fifteen to twenty-five times in a minute.

[Printed, 9*d.*]

A.D. 1856, April 1.—N° 780.

BENTLEY, Joseph.—"Improvements in breach-loading fire-"arms, and in the cartridges to be used therewith." Sliding barrel.

The barrel has a reciprocatory sliding motion in the stock, the breech has a projection fitting the rear end of the barrel. The barrel is pushed forward by a lever to receive the charge.

The cartridges have backs made of thin paper, "having a number " of minute holes punctured in the centre; this is covered with a " perforated wad, and the flash from the cap passes easily through " it and the perforated paper. A small quantity of gun-cotton " may be used to prevent the escape of the powder through the " holes."

[Printed, 11*d.*]

A.D. 1856, April 7.—N° 843.

TERRY, William.—"Improvements in breach-loading fire-" arms."

The Specification and drawings, which should be referred to, describe a piston or sliding breach plug which is fitted into the rear end of the barrel, or breech case, when pushed up it is fastened in its place by means of lugs. When drawn back it exposes a slot or opening made in the side of the barrel, through which the cartridge is inserted.

Suitable springs, catches, and levers are attached to the piston for the purpose of moving or securing it. The piston is lubricated by fibrous packing saturated with oil, and fitted in a recess in the breech case.

[Printed, 10*d.*]

A.D. 1856, April 15.—N° 895.

FORBES, Hugo Frederick.—"Improvements in breech-" loading fire-arms and ordnance, and in projectiles used there-" with."

The breech end of the piece terminates in a cylinder, which is eccentric to the bore; a screw is inserted in the cylinder which has a diameter about twice that of the bore.

The screw is bored through eccentrically, and when screwed *home by* means of a projecting handle, the solid part of it closes the bore, when it is turned in a contrary direction the hole made in it coincides with the bore. Projectiles are made with their fore parts much heavier than the rear parts.

[Printed, 6*d.*]

A.D. 1856, April 16.—N° 905.

NEWTON, Alfred Vincent.—"Improvements in fire-arms "and powder-flasks."—A communication. Sights. Lubricating apparatus. Flasks.

Sights that are not costly or difficult to be adjusted are made by fixing a sight-notch at the end of an arm connected with the barrel by a hinged friction joint, which is regulated by "a temper "screw," so that the position of the sight may be changed laterally. The arm may be fixed at any required angle marked by a suitable index, and the sight is thereby placed at the required elevation.

A lubricating tube containing oil, and fixed at the end of a suitable rod, is passed into the barrel or charge chamber, and distributes a small quantity of oil on the bullet or inside the barrel, so as to prevent the piece from becoming fouled.

Powder-flasks are made with a sliding chamber of the size requisite for containing a charge; this is interposed between the charging nozzle and the body of the flask, and is made to communicate alternately with either.

[Printed, 1*s.* 2*d.*]

A.D. 1856, May 17.—No 1177.

TEVIS, Charles Carroll.—"An improved revolver."—(Provisional Protection only.)

The Provisional Specification, with drawings, describes a revolver, which is cocked, turned, and discharged by pulling the trigger. The chambers may be loaded from the rear by removing a moveable back plate.

[Printed, 8*d.*]

A.D. 1856, May 21.—N° 1212.

LAWRENCE, Thomas.—"Improvements in machinery to be "used for grinding and polishing gun-barrels, swords, matchets, "bayonets, scythes, &c."

The Specification and drawings describe self-acting grinding machinery, consisting of wheels or stones mounted in moveable frames, for grinding and polishing furrowed or grooved as well as flat surfaces.

[Printed, 9*d.*]

A.D. 1856, June 3.—Nº 1313.

WILLETT, THOMAS WILLIAM.—" Improvements in the manu-" facture of gunpowder."

Jets of steam are employed for regularly and evenly moistening the charge of powder while it is in the mill. The steam is made to issue by preference from pipes revolving with the runners or rollers.

Artificial currents of air are introduced into the incorporating gunpowder mill, for the purpose of drying the charge at the proper stage of manufacture.

[Printed, 7*d.*]

A.D. 1856, June 10.—Nº 1381.

NEWTON, ALFRED VINCENT.—"An improvement in projec-" tiles for ordnance."—A communication.

A cup-shaped cylinder of wrought-iron is attached to the butt or rear end of elongated cast-iron projectiles. The sides of the cylinder project beyond the butt, and are made thin so that they can be expanded by the explosion and so correct windage.

[Printed, 6*d.*]

A.D. 1856, June 11.—Nº 1388.

NEWTON, ALFRED VINCENT. — "Improvements in breech-" loading fire-arms."—A communication.

The Specification and drawings, which should be referred to, described a barrel with a funnel-shaped opening in the rear end of the breech for admitting the charge. A moveable breech-piece actuated by a lever trigger-guard, closes the breech end of the barrel.

Grooves of depths decreasing from breech to muzzle may be used. Primers, consisting of patches attached to a long strip of paper or metal, are employed.

[Printed, 11*d.*]

A.D. 1856, June 13.—N° 1405.

JACOT, **William**.—" Improvements in fire-arms." Locks.—A communication.

The lock is so arranged that the piece is cocked by pressing the hand upon the trigger-guard, one end of which is centred to the plate of the lock, the other rests on the tail of the hammer.

The hammer, when raised, is retained by a tooth on the trigger, which falls into a notch on the trigger. When the trigger is pulled the tooth is withdrawn, and the hammer descends.

[Printed, 9*d.*]

A.D. 1856, June 14.—N° 1415.

LINDNER, **Edward**.—" Improvements in breech-loading fire-" arms." Hinged breech-piece. Asbestos packing.

A moveable breech-piece turning on a hinge or centres is attached to the rear end of the barrel, and is turned upwards to receive the charge. The breech-piece is provided with suitable springs and catches, and may be turned up by hand; or the projectile as it passes along the barrel is made to press down a wedge which works in a slot formed in the barrel near the muzzle. This wedge acts on a long rod attached underneath the barrel, and connected with the breech-piece; the rod acting on a lever turns up the breech-piece, and presents it ready to receive another charge.

Asbestos packing is used to make the joints tight, and a sliding ring is employed to make a close joint at the breech.

[Printed, 7*d.*]

A.D. 1856, June 17.—N° 1430.

BAKEWELL, **Frederick Collier**.—" Improvements in per-" cussion bombshells."—A communication.

The percussion apparatus consists of a conical tube placed at the nose of the shell in which a piston is placed, which is driven upon a percussion patch or wafer when the shell strikes an object. An india-rubber tube is connected with the piston, which prevents it from being made to strike the patch by any weak accidental blow.

A sabot of soft metal may be employed with the projectile when it is fired from a grooved bore.

[Printed, 6*d.*]

A.D. 1856, June 27.—N° 1517.

BURNAND, Edward.—"An improvement in the manufacture "of fire-arms." Rifles.

Spiral grooves are employed for rifled fire-arms, which have an angle or pitch considerably more obtuse at the muzzle than at the breech, and varying according to the length and calibre of the barrel.

[Printed, *6d.*]

A.D. 1856, July 1.—N° 1539.

HADDAN, John Coope.—"Improvements in the manufacture "of projectiles, and in firing or discharging them from cannon."

Elongated projectiles are made with their rear ends shaped into a series of shoulders or steps to prevent the wad from being wedged too tightly upon the projectile. Machinery for making projectiles with wings is described, and consists of improvements upon the machinery described in the Specification of Letters Patent dated October 30, 1854 (see Patent, No. 2305, p. 179.) Electro-magnets are used for effecting the discharge of ordnance.

[Printed, *10d.*]

A.D. 1856, July 8.—N° 1604.

HOFFMAN, Frederick William.—"Improvements in breech-"loading fire-arms."

The breech end of the barrel is closed by a moveable cap, which is connected with the hammer, and is moved by it when the piece is cocked. The cap consists of a thick plate of the same circumference as the barrel; it is secured to the stock "by two arms "parallel with the barrel, and embracing it on either side. The "ends of these arms terminate in pivots, which drop into sockets "formed in the stock. The cap may be lifted up clear of the "barrel, and dropped over it again."

[Printed, *6d.*]

A.D. 1856, July 8.—N° 1608.

NEWTON, **Alfred Vincent**.—" Improvements in repeating " fire-arms."—A communication.

These consist in the employment of "a toggle connexion be- " tween the cylinder or the rotating recoil-shield and the stock," for the purpose of giving a longitudinal motion to the cylinder, and causing it to clear the barrel when turned, and also forcing it into close connexion therewith during the discharge. "The toggle " connection is operated by means of a finger lever under the " stock."

The connexion between cylinder and barrel is adjusted by a regulating screw. The drawings should be referred to.

[Printed, 6*d.*]

A.D. 1856, July 30.—N° 1803.

SIMONS, **Francis Constable**.—" An improvement in rifling " the barrels of fire-arms and ordnance."—(Provisional Protection only.)

In cutting rifle grooves, it is proposed to make " the two sides of a " groove tangents to the circle of the bore, and the sides of a groove " are connected by a straight or curved line."

[Printed, 3*d.*]

A.D. 1856, July 31.—N° 1806.

KERR, **John James**.—" Improvements in the manufacture of " cartridges for fire-arms."—(Provisional Protection only.)

It is proposed to make the cartridge case of suitable metallic tubing. Where it is requisite, the metallic tubing may be weakened by applying to it a solution of nitric or other acid.

[Printed, 3*d.*]

A.D. 1856, August 5.—N° 1849.

NEWTON, **Alfred Vincent**.—" An improvement in primers " for fire-arm cartridges."—A communication.

The cartridges are made up with fulminating powder interposed between an iron or steel disc and a cork disc. The fulminating powder is to be enclosed in a perforated case of copper or brass.

[Printed, 5*d.*]

A.D. 1856, August 8.—Nº 1869.

AUSTIN, Thomas.—" A machine for ascertaining the propelling " force of gunpowder."

A recoiling metal target is mounted on a light frame and carriage, which runs on two pairs of light wheels in grooves made in flat metal rails. An index hand is fixed to the carriage and marks on a fixed graduated metal plate or bar the distance to which the target is driven back by a charge of powder and ball, fired at it from any convenient distances, as 10 yards from a rifle or other barrel.

[Printed, 7*d.*]

A.D. 1856, August 14.—Nº 1903.

MORGAN, William.—" Improvements in the manufacture of " guns and mortars." Wrought-iron guns.

Wrought-iron guns are formed by welding together rings or cylinders whose edges are made in the shape of male and female v's accurately fitted together.

[Printed, 3*d.*]

A.D. 1856, August 16.—Nº 1913.

TRANTER, William.—" Improvements in fire-arms." Locks.

The Specification and drawings, which should be referred to, describe revolving fire-arms in which " single action, or double " action, or treble action locks " are used.

The Specification of prior Letters Patent of January 28, 1853, is referred to. (See *ante*, p. 134.)

A lever ramrod is used, in which a plunger is jointed to a lever handle.

[Printed, 10*d.*]

A.D. 1856, August 16.—Nº 1919.

LILLEY, Samuel.—" Improvements in the manufacture of " ships' iron work," &c. Cannon.

In casting ships'-iron work, or ordnance, chilled moulds or metal moulds are to be employed, instead of sand moulds.

[Printed, 3*d.*]

A.D. 1856, August 26.—N° 1992.

NEWTON, Alfred Vincent.—" An improvement in breech-" loading cannons, and other ordnance."—A communication.

The breech end of the piece is closed by a moveable conical plug ór breech-pin, to which a number of expanding segments are attached : these work on hinges, and fold down into grooves in the breech-pin, when the latter is to be inserted in the breech, and when it is in its place, the segments are expanded by the action of a screw or otherwise, and take into an angular recess formed in the breech-end of the cannon, and so prevent the pin from being blown out.

[Printed, 6*d.*]

A.D. 1856, August 27.—N° 1999.

NEWTON, Alfred Vincent.—" An improvement in projectiles " for cannon."—A communication.

Cutting blades are attached by hinges and springs to the projectile, and are fitted in suitable grooves. When the projectile issues from the muzzle of the piece, the blades are made to stand out from the projectile, and serve to cut away rigging and other obstacles which they may meet with.

[Printed, 7*d.*]

A.D. 1856, August 30.—N° 2015.

JOHNSON, John Henry."—" Improvements in fire-arms." —A communication. Touch-hole.

A tubular channel is made to project into the breech, and communicate with the touch-hole in such a way that the flash from the cap passes through the channel, and ignites the powder at its fore part, by that means the charge may be entirely consumed.

[Printed, 5*d.*]

A.D. 1856, August 30.—N° 2021.

CONANT, Hezekiah.—" A new and useful improvement in " fire-arms." Breech-loader.

A sliding breech is used for breech-loading fire-arms, and a metallic ring or chamber or its equivalent is applied to the open rear end of the barrel to prevent the escape of the gases.

The ring may also be applied to the forward part of the charge-chamber, or the rear end of the barrel of a revolver.

[Printed, 8*d.*]

A.D. 1856, September 1.—N° 2030.

NEWTON, ALFRED VINCENT.—" An improved charger for shot " pouches."—A communication.

The Specification and drawings describe shot pouches which may be made in several compartments attached to corresponding nozzles or tops, which are connected with the pouch by lugs and slots.

The tops or charges are provided with suitable slides, adjustable catches and springs for guaging the charges.

[Printed, 6*d.*]

A.D. 1856, September 4.—N° 2059.

HAYES, JOHN MONTAGU.—" An improvement in the construc- " tion of cartridges for fire-arms."

A skin or membrane (prepared from the gut of animals, as pigs, or birds or reptiles) is used instead of paper for cartridges, which are made without seam. A covering of net-work or thread may be used to strengthen the cartridge.

[Printed, 3*d.*]

A.D. 1856, September 4.—N° 2062.

ALDBOROUGH, EARL OF, STRATFORD O'NEALE BENJAMIN. —" Improvements in aerial navigation, and in the apparatus con- " nected therewith," &c.

The Specification and drawings, which are very numerous, describe apparatus and vessels suitable to aerial and partly to water navigation, and which may be used for attacking fortified places, especially those in northern latitudes, which are inaccessible by land or water in winter.

[Printed, 6*d.*]

A.D. 1856, September 6.—N° 2082.

WILKENS, WILLIAM.—" Revolving cylinder battery or cannon, " and apparatus connected therewith."—A communication. Revolver cannon.—(Provisional Protection only.)

It is proposed to mount a revolving cylinder containing the charge chambers on a strong frame, which is fixed on a circular table or bed. Each chamber has a projecting conical mouth, which fits in the rear end of the barrel of the piece.

Self-acting apparatus is employed for loading and cleaning the piece, and water is employed to cool it when heated.

[Printed, 3*d.*]

A.D. 1856, September 8.—N° 2094.

RESTELL, THOMAS.—" Improvements in breech-loading fire-
" arms and ordnance."

A breech bolt of a cylindrical or partly cylindrical piece of metal is employed. It is passed " through a collar in a piece with the
" breech end of the barrel, and is clasped and held down through
" its whole length by the sides of the barrel closing partially over
" it." This bolt has a reciprocating motion, and on the front end of it is fitted an expanding washer of india-rubber or steel. A rotating or partly rotating disc, moved by a lever handle, works in recesses in the sliding breech bolt, to which it communicates motion for opening and closing the breech chamber by means of projections formed on each. The drawings should be referred to.

[Printed, 10*d.*]

A.D. 1856, September 12.—N° 2134.

PITMAN, JOHN TALBOT.—" Improvements in repeating fire-
" arms."—A communication. Lock.

The Specification and drawings describe a revolving fire-arm, in which the breech cylinder is turned, and the piece is cocked and discharged by pulling the trigger. The parts of the lock are so arranged that the mainspring is relieved from all strain while the hammer remains cocked.

[Printed, 7*d.*]

A.D. 1856, September 12.—N° 2137.

PATON, EDWARD, and WALSH, CHARLES FREDERICK.—
" Improvements in fire-arms and projectiles." — (Provisional Protection only.)

It is proposed to make rifles, the section of whose bore resembles a ratchet wheel, with flat-fronted teeth. The projectile is made with wings or ribs.

[Printed, 3*d.*]

A.D. 1856, September 13.—N° 2145.

JOHNSON, JOHN HENRY.—" Improvements in fire-arms."—A communication. Rifled cannon. Rifling machinery.

The Specification and drawings, which should be referred to, describe machinery for rifling fire-arms with an increasing pitch, and with grooves diminishing in depth from the breech to the muzzle.

It is proposed to employ a metal stronger and less brittle than cast iron, being an intermediate compound between steel and iron.

[Printed, 1*s*. 11*d*.]

A.D. 1856, September 15.—N° 2158.

ROWAND, Alexander.—" Improvements in cases or vessels " for holding gunpowder." Glass vessels.

Instead of metal cases, glass vessels of an elongated shape, and in transverse section, forming a flat ellipse, are to be used for holding gunpowder. Cork or screw stoppers may be employed. Different coloured glasses may be used for indicating different kinds of powder.

[Printed, 6*d*.]

A.D. 1856, September 18.—N° 2188.

GUILLAUMIN, André Gabriel.—" An improved ramrod." —(Provisional Protection only.)

Malacca and other canes are proposed to be used for ramrods. The joints, if there are any, are to be planed down and painted.

[Printed, 3*d*.]

A.D. 1856, September 27.—N° 2268.

HAYES, John Montagu.—" Improvements in percussion cap- " holders."—(Provisional Protection only.)

It is proposed to employ vulcanized india-rubber strips with suitable recesses made therein for holding caps ready for use.

[Printed, 3*d*.]

A.D. 1856, September 29.—N° 2275.

WARD, James Noble.—" An improvement in the construction " of self-priming fire-arms."

Fire-arms are described having self-acting apparatus for feeding strips with priming patches, or Maynard's primers, from a chamber in the hammer head. The protruding portions of the primer are severed by means of the hammer and cone as the hammer falls.

[Printed, 5*d*.]

A.D. 1856, October 8.—N° 2362.

JULIEN, FRANÇOIS.—" Improvements in ordnance or cannon." Breech-loading ordnance.—(Provisional Protection only.)

It is proposed to make ordnance with a perforated plug, working in the breech. The piece may be discharged by percussion caps. Self-acting apparatus for loading the piece is referred to.

[Printed, 3*d.*]

A.D. 1856, October 10.—N° 2377.

JOHNSON, WILLIAM.—" Improvements in the manufacture of " fulminating powder."—A communication.—(Provisional Protection only.)

It is proposed to employ amorphous phosphorus with salts of lead, baryta, strontium, soda, potass, tin, or zinc, for manufacturing fulminating powder.

Amorphous phosphorus 83 parts, nitrate of lead 917 parts, are suitable proportions.

[Printed, 3*d.*]

A.D. 1856, October 24.—N° 2496.

GWYNNE, JAMES EGLINTON ANDERSON.—" Improvements in " the manufacture of carbon or charcoal powder for various useful " purposes." Gunpowder.—(Provisional Protection only.)

Charcoal powder suitable for being made into gunpowder is obtained from raw peat, boghead coal, and lignite. The substances are purified if it be requisite, and are burned in closed retorts, at a low red heat.

[Printed, 3*d.*]

A.D. 1856, November 3.—N° 2578.

MIDDLETON, SAMUEL.—" Improvements in the manufacture " of certain articles of leather without seams." Military accoutrements.

The leather, when properly prepared, is formed by pressing it in a screw press or similar apparatus in the required shape. When articles are required to be made without seams, the skins of the tails of various animals, as calves, pigs, &c., are stripped off whole, and dressed without seams with the apparatus described.

[Printed, 2*s.* 2*d.*]

A.D. 1856, November 10.—N° 2642.

MANCEAUX, François Jules, and VEILLARD, Eugene Napoleon.—" An improvement in breech-loading fire-arms and " ordnance."

In order to prevent the escape of the gases of combustion, a conical sliding plug is employed. It is " conical at the outside, " and also hollowed out conically in the inside, and into it is " screwed a conical tapering solid plug." The front of the outer plug fits into the conical seat of the barrel. The explosion forces back the solid conical plug, and spreads out the mouth of the hollow plug, and makes a tight joint.

[Printed, 6*d*.]

A.D. 1856, November 11.—N° 2656.

JOHNSON, John Henry.—" Improvements in projectiles."—A communication.

Spherical projectiles are made with the centre of gravity in front of the centre of the figure. The projectile is allowed to float in a bath of mercury. The lightest part, which will be uppermost, is marked, and a hole is there bored and filled with wood or other light material. The hole may be filled with a bursting charge.

[Printed, 8*d*.]

A.D. 1856, November 29.—N° 2826.

JOHNSON, William.—" Improvements in projectiles."—A communication.

Moveable expanding wings or vanes are attached to the projectiles. They may be fired with cases, or collars attached to their rear end, which expand and fill up the grooves in rifled barrels.

[Printed, 7*d*.]

A.D. 1856, December 3.—N° 2868.

GENHART, Henry.—" Improvements in fire-arms and ordnance, " and of the cartridges or projectiles to be used therewith." Breech-loaders.

Breech-loading fire-arms are made with a breech piece which rotates horizontally on a vertical axis. A percussion tube, made of copper or glass, is attached to the cartridge, which is to be dipped in melted stearine or other similar substance. The gunpowder may be moistened with spirits of wine, which evaporates and " leaves the powder in close contact with the shot."

[Printed, 8d.]

A.D. 1856, December 12.—N° 2952.

PATON, EDWARD, and WALSH, CHARLES FREDERICK.—" Improvements in apparatus for charging and capping the nipples " of fire-arms."

The apparatus consists of a metal tube containing another metal tube actuated by a spring and provided with a needle. It is used for injecting the powder into the touch-hole after a miss-fire. A tubular magazine is also attached to the apparatus for containing the gunpowder.

[Printed, 6*d.*]

A.D. 1856, December 20.—N° 3016.

HARRISSON, GEORGE ALEXANDER.—" Improvements in " breech-loading fire-arms."

The breech-piece is " fitted in a recess at the rear end of the " barrel, and is capable of backward and forward and rising " motions." The breech-piece is tapered at its fore end, and fits into the rear of the barrel. It is drawn back by a lever, " which " at the same moment frees a metal wedge at the back thereof."

[Printed, 10*d.*]

A.D. 1856, December 22.—N° 3036.

PRINCE, FREDERIC.—" Improvements in fire-arms."

These are stated to " consist in producing more positive expan- " sion in the plug described " in the Specification of previous Letters Patent, dated February 21, 1855. (See N° 386, p. 204.) The plug is made hollow or concave, and a steel or other plunger is fitted therein, which bears " more particularly on the upper rim " of the aforesaid concave part, being quite free at the bottom " thereof," and is arranged as shown in the drawing.

[Printed, 6*d.*]

1857.

A.D. 1857, January 10.—N° 87.

ADAMS, JOHN.—" A minié or other rifle sight on a new and " improved plan."—(Provisional Protection only.)

It is proposed to dispense with side steps, and to employ a moveable slide, moved from the extreme end of the cap towards the joint.

[Printed, 3*d.*]

A.D. 1857, January 14.—N° 119.

BLITTKOWSKI, Gustav Adolph.—" Improvements in breech-" loading fire-arms." Breech-loader locks.—(Provisional Protection only.)

A cylindrical breech-piece is to be used. It is hinged and turned upwards to receive the charge.

The lock is simple in construction; the hammer is to be formed in one piece with the tumbler.

[Printed, 3*d*.]

A.D. 1857, January 22.—N° 192.

ENGSTROM, Carl Christian.—" Improvements in the con-" struction of projectiles for rifled guns and mortars."

Projectiles for rifles are made with ribs or wings of wood attached to them, which fit in the grooves of the piece. A wooden cap may be employed to expand the projectile.

[Printed, 7*d*.]

A.D. 1857, January 23.—N° 208.

FONTAINEMOREAU, Peter Armand le Comte de.—" Improvements in fire-arms, and in the bullets to be used there-" with."—A communication. Breech-loader. Grooved projectiles.

The Specification and drawings, which should be referred to, describe a breech cylinder, which is screwed into the barrel, and has a powder chamber and a conical projection or lip, which fits into a groove in the base of the projectile. " At the base of the " conical projection are a number of small holes, which have their " edges countersunk," and correspond with the grooves in the barrel.

Elliptical grooves are formed on the projectile.

[Printed, 5*d*.]

A.D. 1857, January 31.—N° 288.

MORRISON, Duncan.—" A new or improved manufacture of " ordnance." Casting.

A metallic core is inserted in the axis of the mould used in casting ordnance. The metal is poured into the annular space left between the mould and the smooth core, which produces a smooth bore. If the core have suitable projections or ribs, a rifled bore is produced. Or ordnance may be cast upon a tube of copper or other metal, which is made to form the bore.

The tube may be strengthened by attaching to it longitudinal bars.

[Printed, 3*d.*]

A.D. 1857, February 4.—N° 320.

GANDINI, Odoardo.—"An indicating target."—(Provisional Protection only.)

The target is to be made of a number of tubes connected together, and presenting their ends as a mark. When any tube is struck, it is made to expose a number by means of suitable apparatus connected therewith.

[Printed, 3*d.*]

A.D. 1857, February 5.—N° 335.

NEWTON, William Edward.—" Improvements in breech-" loading fire-arms." Self-loading apparatus.—A communication. (Provisional Protection only.)

It is proposed to form in the stock of a gun a tubular charge magazine, in which cartridges may be contained. It is moved forward by a screw.

A sliding breech, moved by a lever trigger-guard, may be employed.

[Printed, 3*d.*]

A.D. 1857, February 7.—N° 351.

CRICKMAY, Charles.—" Improvements in breech-loading " guns or pistols," &c. Breech-loaders.

The Specification and drawings, which should be referred to, describe breech-loading fire-arms and improvements on the invention described in the Specification of former Letters Patent of June 20, 1853. (See Patent, N° 1499, p. 145.)

A revolving breech is employed in connexion with the requisite number of cams. " If the circle of the barrel be divided into six " parts, cams are formed on every alternate part on or connected " with the barrel. Corresponding cams are formed on the breech. " The connecting surfaces of these cams are inclined like the " thread of a screw."

Self-priming cartridges are used. A revolving collar is employed to contain spare cartridges.

[Printed, 10*d.*]

A.D. 1857, February 7.—N° 364.

WILKENS, William.—"An improved cannon, which he calls a "revolving battery."—A communication.

A horizontal revolving breech or chamber piece is used with a single fixed barrel. The charge chambers are formed in the periphery of the breech-piece.

[Printed, 1*s.* 8*d.*]

A.D. 1857, February 10.—N° 393.

BROOMAN, Richard Archibald.—"An improvement in or "addition to the locks of fire-arms."—A communication.—(Provisional Protection only.)

A rod or safety bolt is to be attached to the lock, to prevent at pleasure the cocking or the descent of the hammer.

[Printed, 3*d.*]

A.D. 1857, February 11.—N° 401.

ARMSTRONG, William George.—"Improvements in ord"nance." Wrought-iron guns.—(Provisional Protection only.)

It is proposed to form a gun with an internal tube of wrought iron or gun metal, with cylindrical casings of wrought iron or gun metal shrunk on.

A moveable breech-piece may be used; it is fixed by means of a screw, which may be perforated to admit the charge at the rear end of the piece.

[Printed, 3*d.*]

A.D. 1857, February 11.—N° 404.

MACINTOSH, John.—"Improvements in the manufacture "and discharge of projectiles."

Gunpowder and other explosive compounds are mixed with india-rubber or gutta-percha in a state of solution, and the mixture is spread upon cloth, which becomes inflammable, and burns rapidly when mixed with chlorate or nitrate of potass, and slowly if it be mixed with steel filings or sulphur. The cloth may be cut *into strips,* and be made up into balls to form part of a charge for a shell, or it may be attached to projectiles when fired, and being ignited will set on fire whatever it may come in contact with. Similar compositions are used for charges for discharging projectiles, and may be placed in hollows formed in their rear ends.

[Printed, 4*d.*]

A.D. 1857, February 21.—N° 505.

BLAKELY, Alexander Theophilus.—"Improvements in "ordnance."—(Provisional Protection only.)

The Provisional Specification states that the object of the invention is to form the diameter of the bore of the gun of the proper proportion to the thickness of metal to enable it best to resist strain; the proportion should be about as 2 to 1.

A tube of metal, which may be coated with coils of wire, may be fitted into the bore.

[Printed, 3*d.*]

A.D. 1857, February 24.—N° 545.

MITCHELL, Alexander.—"Improvements in harpoon guns."

A moveable self-adjusting "elevator bar" is attached to the harpoon gun to enable accurate aim to be taken. The harpoon is connected to the gun by a line, whose length equals that of the range of the piece.

[Printed, 6*d.*]

A.D. 1857, March 3.—N° 622.

LINDNER, Edward.—"Improvements in cartridges and bullets, "together with an apparatus for producing the same." Projectiles and mould.

The paper or other material used for the cartridge case is attached either by casting or by pressure to the bullet, which may also have rings of leather connected thereto. A rod or pin is attached to the rear end of the bullet, on which may be fixed a percussion cap for firing the charge.

The mould is fitted with a plunger, round which the paper case is rolled. "This plunger descends into the mould to such extent "that it exposes one of the ends of the roll to the lead," which is poured in from the opposite end of the mould. Grooves may be made in the mould, and leather rings inserted therein, which, when the lead is poured in, are attached to the bullet.

[Printed, 7*d.*]

A.D. 1857, March 4.—N° 631.

RALSTON, Gerard.—" Improvements in fire-arms and in balls " or projectiles."—A communication. Breech-loading arms.

A barrel with an open breech is screwed into a breech case formed in the stock. The lock is fixed in a lock-frame, which is hinged and has a projecting plug at its fore end, which closes the rear end of the barrel. The trigger-guard forms a lever, by means of which the hinged frame carrying the lock and closing plug is turned down to allow the charge to be inserted. Tape priming is used. The projectiles are made with an angular groove round their fore ends.

[Printed, 7*d.*]

A.D. 1857, March 7.—N° 673.

RESTELL, Thomas.—" Improvements in or connected with fire- " arms." (Letters Patent were not obtained; the law officer refused to grant Provisional Protection.)

The Provisional Specification states that the invention relates to an arrangement of the parts of a lock and a mode of forming stocks with parts cut away to receive the fastening rings.

[Printed, 3*d.*]

A.D. 1857, March 9.—N° 678.

TYTHERLEIGH, William.—" Improvements in the manufac- " ture of bullets and shots."—(Provisional Protection only.)

It is proposed to make projectiles of cast iron and anneal them. Dies and pressure are to be used in making wrought-iron shot. Small cast-iron shot are made by allowing cast iron to fall from a perforated ladle like leaden shot.

[Printed, 3*d.*]

A.D. 1857, March 19.—N° 772.

BROOMAN, Richard Archibald.—" An improved projectile." —A communication.—(Provisional Protection only.)

A shell projectile, suitable for being fired at whales, is made with a copper cylinder encased at its rear end in lead.

A piston is fitted in the copper head of the projectile, whose charge is to be ignited on the percussion principle.

[Printed, 3*d.*]

A.D. 1857, March 25.—N° 839.

COWPER, Charles.—" Improvements in the manufacture of " shot and shells for rifled ordnance."—A communication.

The projectiles are cast of a cylindro-conoidal form, with belts or ribs, which are made at first larger than the fore or grooves, and are afterwards planed down by machines to the requisite size. The body of the projectile between the rings and the ribs is recessed.

[Printed, 7*d.*]

A.D. 1857, April 1.—N° 899.

GREVES, Charles.—" Improvements in breech-loading guns " and pistols."—(Provisional Protection only.)

It was proposed to give to the barrel a reciprocating motion on the stock, and use a fixed conical breech.

[Printed, 3*d.*]

A.D. 1857, April 1.—N° 907.

NEWTON, Alfred Vincent.—" Improvements in fire-arms." —A communication. Breech-loader. Hair-trigger.

The Specification and drawing, which should be referred to, describe a fire-arm having a hinged breech-piece containing a moveable tube and a ring or washer, made of suitable material, intended to form a charge chamber, which will always preserve a close joint. The breech-piece is hinged above the barrel, and is turned upwards and over towards the muzzle to admit the charge. When in its place it is secured by a reciprocating bolt connected with the lock, which is pushed home before the hammer can fall on the nipple.

A hair-trigger is described, having a friction roller attached to it connected with a spring.

[Printed, 11*d.*]

A.D. 1857, April 2.—N° 921.

NEWTON, Alfred Vincent.—" Improvements in repeating " fire-arms."—A communication.

The Specification and drawings, which should be referred to, describe a revolver with " a casque " or casing, which partly encloses the rotating breech-piece. Other improvements are described, relating to the lock and rotating apparatus, which are intended to give " readiness of operation, durability, and facility for " repair," and other advantages.

[Printed, 8*d.*]

A.D. 1857, April 7.—N° 971.

ROTHWELL, John, and COOPER, Samuel Dixon.—"Improvements in breech-loading fire-arms."—(Provisional Protection only.)

A short length or boss is connected excentrically with the rear end of the barrel. A moveable breech, actuated by a screw, works in the boss; it is bored excentrically, when its hole coincides with the bore; the rear end of the barrel is exposed by turning the breech partly round; the rear of the barrel is closed.

[Printed, 3*d.*]

A.D. 1857, April 8.—N° 994.

NEWTON, Alfred Vincent.—"Improvements in hand "bullet moulds."—A communication.

Bullet moulds are made so that they are opened by pressing the two handles with one hand towards another, instead of requiring two hands to separate them. The lips are kept closed by the action of a spring. A cutter, operated by the opening of the mould, is used to cut the "sprue" from the bullet. A moveable core piece is used for casting hollow bullets.

[Printed, 3*d.*]

A.D. 1857, April 9.—N° 996.

BROOKS, Edgar.—"Improvements in the manufacture of "fire-arms." Barrels. (Provisional Protection only.)

It was proposed to make gun-barrels by twisting a rod round a mandril, and placing it in a semicylindrical grooved die, and rolling it with a grooved roller.

Self-acting machinery is to be used for cutting slots in the break-off, and in shaping the hutts.

[Printed, 3*d.*]

A.D. 1857, April 9.—N° 1003.

ALEXANDER, Edwin Powley.—"Improvements in the "manufacture of fulminating powder."—A communication.—(Provisional Protection only.)

It is proposed to employ, in the manufacture of fulminating powder, of amorphous phosphorus about 83 parts, and of nitrate of lead 917 parts; salts of other suitable metals might be used.

[Printed, 3*d.*]

A.D. 1857, April 9.—N° 1012.

HADDAN, John Coope.—" Improvements in the manufacture " of and in the means of and apparatus for discharging projectiles."

Projectiles are made with openings or touch-holes passing through them, so that they may be fired from a piece by igniting the charge from the muzzle, either by electric agency, or by fuses, or other means.

[Printed, 10*d.*]

A.D. 1857, April 11.—N° 1025.

LEJARD, François Desir.—" An improved safety apparatus " to be applied to the triggers of fire-arms."—(Provisional Protection only.)

A spring catch is to be used for holding the trigger until it is disengaged therefrom by drawing a bolt placed in front of the trigger-guard.

[Printed, 3*d.*]

A.D 1857, April 14.—N° 1058.

JOHNSON, John Henry.—" Improvements in fire-arms."—A communication. Locks.—(Provisional Protection only.)

It was proposed to attach to the free end of the mainspring an antifriction roller.

[Printed, 3*d.*]

A.D. 1857, April 18.—N° 1098.

GRANVILLE, William Henry Dearing.—" Improvements " in fire-arms, and in the means of loading the same." Self-loading apparatus and charge magazine.

Several tubular magazines are made in the stock of a fire-arm, which are provided with springs and self-acting apparatus.

Fulminating composition is made up with the cartridges, which are exploded by a needle apparatus.

[Printed, 7*d.*]

A.D. 1857, April 18.—N° 1100.

JAHN, Gustav.—" Improvements in revolver fire-arms."—(Provisional Protection only.)

It is proposed to employ a needle fixed on a lever turning on an axis for discharging the piece. Self-acting charging chambers may be used.

[Printed, 3*d.*]

A.D. 1857, April 20.—N° 1110.

TINDALL, Robert.—"Improvements in harpoon guns and "ammunition."

The Specification and drawings describe swivel guns for firing harpoon projectiles of various kinds used in capturing whales. The projectiles have moveable barbs and wings, and may have ropes attached thereto, or be made hollow, and provided with a bursting charge.

[Printed, 1*s*.]

A.D. 1857, April 30.—N° 1213.

BALL, Henry.—"Improvements in repeating and other fire-"arms."—(Provisional Protection only.)

The Provisional Specification relates to locks and a mode of attaching the barrel to the stock, also to lever ramrods and a kind of shield provided with a fire-arm.

[Printed, 3*d*.]

A.D. 1857, May 6.—N° 1285.

SCHWAB, Frederick Martin.—"Improvements in breech-"loading fire-arms."—(Provisional Protection only.)

The barrel of the fire-arm turns on centres attached to the stock, the muzzle is depressed to admit the charge at the rear end, and a rotating catch is used to fasten the barrel when ready to be discharged.

[Printed, 3*d*.]

A.D. 1857, May 13.—N° 1357.

MORSE, George Woodward.—"An improved breech-loading "fire-arm."

The Specification and drawings, which should be referred to, describe a breech-loading fire-arm provided with a sliding "breech "block or closer" having nippers and taggles. A hammer and lock of peculiar construction are used, with a cartridge made up with a percussion patch or cap attached thereto.

[Printed, 10*d*.]

A.D. 1857, May 14.—N° 1358.

SAUERBREY, Valentin.—"Improvements in the manufacture "of fire-arms."—(Provisional Protection only.)

The Provisional Specification relates to an instrument provided with three cutters, with setting-out apparatus for cutting grooves in rifle barrels.

[Printed, 3*d.*]

A.D. 1857, May 19.—N° 1402.

ROYS, Thomas Welcome.—"Improvements applicable to ex-"plosive shells."

These relate to the construction and mode of exploding an elongated shell. A groove or grooves may be formed in the side of the shell, and the ignition of the propelling charge ignites powder or a fuse contained in the side groove, and communicates fire to the bursting charge at the front end of the shell.

The Specification states that the invention is adapted to the hexagonal rifles and projectiles "constructed according to the "invention of Mr. Whitworth of Manchester."

(See Patents, N° 2525, p. 187. N° 903, p. 213.)

[Printed, 10*d.*]

A.D. 1857, May 19.—N° 1403.

REEVES, Charles.—"New or improved grinding and polishing "machinery, to be used in the manufacture of knives, matchets, "swords, and other similar articles."

The articles required to be ground are attached in suitable positions to a slowly revolving drum, which turns in contact with a grinding stone revolving at a great speed. Many articles, as knives, sword blades, are thereby ground simultaneously.

[Printed, 6*d.*]

A.D. 1857, May 27.—N° 1505.

PETROVITCH, Milivoi.—"The improvements in projectiles "used with fire-arms."

Projectiles are made with two deep angular grooves round the rear end. The base may be hollowed; but by preference a deep circular groove is made therein, concentric with the axis of the projectile, which is left solid.

[Printed, 6*d.*]

A.D. 1857, June 4.—N° 1571.

MARTEL, Cherie.—" Improvements in fire-arms." Safety lock.

A safety bolt of cast steel is used; it is fitted with cog teeth at one end, and acted upon by a pivot, which is to be turned by hand, to engage or disengage the hammer.

[Printed, 6*d.*]

A.D. 1857, June 4.—N° 1574.

HARDING, William.—" An improvement in pistol holsters." —(Provisional Protection only.)

A series of metal tubes are proposed to be attached to the side of the holster to contain cartridges. The tubes are covered by the holster flap.

[Printed, 3*d.*]

A.D. 1857, June 4.—N° 1575.

ROYS, Thomas Welcome.—" Improvements applicable to " fire-arms."—(Provisional Protection only.)

It was proposed to form a chamber in the rear of the breech of a fire-arm, and insert therein elastic substances, as cork, india-rubber, or wood or other compressible substances.

[Printed, 3*d.*]

A.D. 1857, June 8.—N° 1603.

BROOKS, Edgar.—" A new or improved manufacture of gun- " barrels and other articles of like manufacture." Welding.

A rod of iron is coiled in a helical direction on a mandril, and heated; the coil is then placed between a pair of dies, whose interior surfaces have spiral grooves formed in them, so that when the dies are pressed or hammered together the coiled rod is pressed circumferentially and also laterally, and the joints are thereby forced into close contact and welded. Instead of dies, grooved rollers with one or two crossed grooves may be employed. The barrel is afterward hammered or roller into a cylindrical or other shape.

[Printed, 7d.]

A.D. 1857, June 10.—N° 1622.

KOEHLER, Frederic.—" Improvements in gunpowder."—(Provisional Protection only.)

It was proposed to use the following ingredients in making gunpowder:—

" I. A salt composed of
oxygen 38·51
chloride 29·76
kalium 31·73

100·00

II. Sulphur.
III. Charcoal.

Of the above described salt 70 parts
of sulphur 20 „
and of charcoal 10 „

100

are to be mixed together.

[Printed, 3*d*.]

A.D. 1857, June 12.—N° 1645.

WHITWORTH, Joseph.—" Improvements in ordnance, fire-" arms, and projectiles, and in machinery employed in their manu-" facture." Breech-loader. Double barrels. Projectiles. Rifling " and other machinery.

The improvements are founded on those described in former Specifications (see *ante*, pp. 187, 213, 239), and form parts of a " general system of rifled ordnance, fire-arms, and projectiles, " which require to be considered relatively and as a whole, in " order to be properly ascertained and understood."

Breech-loading apparatus is described wherein a screwed breech cap is used, which is removed by hand in connexion with a receding screw-breech.

Double barrels are bored out of a solid piece of metal, as described.

Projectiles, mechanically fitting the barrels for which they are intended, are made hollow, or like a punch in shape, and may be used for piercing soft substances, as wood, &c., and taking out a core, or they may be employed against masonry. Solid projectiles with flat or slightly convex fronts, are employed for being discharged through metal plates and at objects below water.

Machinery is described for boring, turning, and rifling barrels and shaping projectiles.

The drawings should be referred to.

[Printed, 2*s*. 5*d*.]

A.D. 1857, June 23.—N° 1753.

BROOMAN, Richard Archibald.—" Improvements in " breech-loading fire-arms."—A communication.—(Provisional Protection only.)

It was proposed to use a sliding wedge-shaped breech-piece, moved by a hooked lever, and sliding on rollers.

[Printed, 3*d*.]

A.D. 1857, June 24.—N° 1763.

GENHART, Henry.—" Improvements in fire-arms, in rifling the " same, and projectiles employed therewith." Breech-loader. Rifling apparatus.

A moveable breech plug screwed at its fore part is used, a spindle is attached to the breech plug, and a toothed collar is fitted upon it. The barrel turns on centre pins, and is screwed at its rear end. The screwed breech plug is actuated by means of a lever and toothed wheel or segment connected with the stock, and is thereby engaged with or disengaged from the screwed rear end of the barrel. The barrel may be rifled by pressing the exterior of the barrel with grooved rollers, and so forming ribs in its interior by external pressure.

[Printed, 7*d*.]

A.D. 1857, July 7.—N° 1874.

FAULKNER, Charles, and FAULKNER, David.—" Im- " provements in gun and pistol barrels and in cannons, and in " furnaces for the same." Barrels.

The barrel is formed by welding a twisted rod or strip, and is subjected to a " process of cross rolling by means of a horizontal " plate worked to and fro over a stationary plate on which the coil " *is placed*." The barrels, when partially welded, are drawn through grooved rolls over the enlarged head of a stationary mandril. Hammers with grooved faces are used. A cold air chamber is attached to the heating chamber, to receive the welded portion of the barrel while the other part is heated.

[Printed, 3*d.*]

A.D. 1857, July 7.—N° 1879.

PLATT, JOSEPH.—"Improvements in gun-locks."—(Provisional Protection only.)

The Provisional Specification relates to a lock in which an "excentric or cam-shaped tumbler" is employed.

[Printed, 3*d.*]

A.D. 1857, July 9.—N° 1911.

LOGIE, COSMO.—"An improvement in or addition to fire-arms." —(Provisional Protection only.)

A projecting hook or claw, with serrated edges, is attached to the barrel of a fire-arm, and is used for tearing off the end of cartridges.

[Printed, 3*d.*]

A.D. 1857, July 13.—N° 1944.

SMITH, PETER RECTOR.—"Improvements in fire-arms and "ordnance." Mode of rifling.

A rod of metal is fixed inside the barrel concentric with the axis of the bore. A screw is cut on the rod, and a hollow projectile, having an interior screw corresponding with that cut on the rod, is to be used. A plain rod may be employed with a smooth tubular projectile.

[Printed, 9*d.*]

A.D. 1857, July 14.—N° 1958.

SMITH, HUGH, and SMITH, FREDERICK MOORE.—"An "improvement in fire-arms."—(Provisional Protection only.)

It is proposed to use a moveable nipple connected with a spring, so that when the nipple is struck by the hammer its lower part penetrates the cartridge. The action of the spring presses back the nipple.

[Printed, 3*d.*]

A.D. 1857, July 20.—N° 2001.

RESTELL, Thomas.—"Improvements in breech-loading fire-"arms, and in fastening the barrels of fire-arms to their stocks."—(Provisional Protection only.)

A sliding breech is proposed to be used; it has a reciprocating motion in a breech case, to which the barrel is screwed. A toothed wheel and lever are used to move the sliding breech.

Bands, divided at their lower parts, are fitted with screws, by means of which they may be tightened or relaxed as required.

[Printed, 3*d.*]

A.D. 1857, July 22.—N° 2014.

ARMSTRONG, William George.—"Improvements in the "mode of adjusting ordnance for fire by night or day."—(Provisional Protection only.)

It is proposed to attach a quadrant to the piece, by means of which the proper elevation can be ascertained when there is light. By afterwards adjusting the piece to the same elevation, which may be registered, the piece can be adjusted properly when the object cannot be seen.

A suitable arrangement of sights and reflectors may be employed.

[Printed, 3*d.*]

A.D. 1857, August 13.—N° 2163.

EADE, Thomas.—"An improved breech-loading fire-arm and "projectile to be used therewith."—(Provisional Protection only.)

It is proposed to make the barrel with a moveable hinged breech. The projectile has a hollow base and inclined planes or wings on its exterior.

[Printed, 3*d.*]

A.D. 1857, August 22.—N° 2227.

HODGES, Henry.—"Improvements in the manufacture of "gunpowder."

The usual ingredients are mixed in a suitable vessel, into which steam is injected, which dissolves the saltpetre and thoroughly combines the ingredients stirred up.

[Printed, 3*d.*]

A.D. 1857, September 2.—N° 2301.

ROYS, Thomas Welcome.—"Improved apparatus applicable "to the capture of whales and other purposes." Rockets.

Shell rockets, having suitable lines attached thereto, and provided with barbs, are discharged against whales. The propelling charge is not connected with the bursting charge, which is placed in the head of the rocket, and is ignited by a fuse or quick match, as described in the Specification of former Letters Patent, dated May 19, A.D. 1857, (see ante, p. 257.)

[Printed, 10*d.*]

A.D. 1857, September 3.—N° 2309.

INSKIP, Harry.—" Improvements in fire-arms."—(Provisional Protection only.)

A hollow spike is proposed to be fixed in the breech; it communicates with the nipple, and penetrates the rear of the cartridge, so that the flash of the cap readily ignites the charge.

[Printed, 3*d.*]

A.D. 1857, September 8.—N° 2340.

ROYS, Thomas Welcome.—" Improved apparatus applicable to "the capture of whales and other purposes." (Letters Patent were not obtained; the law officer refused to grant Provisional Protection.)

It was proposed to attach to the muzzle of a gun a tube or collar having projecting barbs connected with a cross bar, to which a cord or line is fixed. A shot or shell is fired from the gun, and the tube or collar becomes attached to it as it issues from the muzzle.

[Printed, 3*d.*]

A.D. 1857, September 16.—N° 2400.

LANCASTER, Charles William.—"An improvement in "breech-loading guns, and in projectiles for the same."—A communication.

The invention is stated to consist "in improvements upon an "invention for which Letters Patent were granted September 28 "1854." (See ante, p. 176.)

When a charge is to be fired from the breech-loading piece with a bullet before and a bullet behind it, an annular recess is to be made in the barrel behind the rear projectile, and a felt wad is to be placed at its back, so as to prevent all escape of gases.

[Printed, 9*d.*]

A.D. 1857, September 19.—N° 2440.

ELEY, WILLIAM THOMAS.—"Improvements in percussion "caps."—(Provisional Protection only.)

It is proposed to place round percussion caps, discs or short tubes to strengthen them.

[Printed, 3*d.*]

A.D. 1857, October 5.—N° 2546.

REEVES, CHARLES.—"A new or improved sword."

The sword has a half basket hilt, and is provided with suitable catches, so that it may be attached like a bayonet to a musket.

[Printed, 5*d.*]

A.D. 1857, October 12.—N° 2608.

WANOSTROCHT, VINCENT.—"Improvements in converting "muskets and other fire-arms into rifled fire-arms."—A communication.—(Provisional Protection only.)

A rifled tube is proposed to be introduced into the barrel, and accurately fitted to its interior.

[Printed, 3*d.*]

A.D. 1857, October 13.—N° 2615.

DEANE, EDWARD.—"An improved weapon to be used either "as a sword or as a pistol, or both."—(Provisional Protection only.)

It is proposed to make the stock of a pistol in the shape of a sword handle, and attach the blade of a sword thereto.

[Printed, 3*d.*]

A.D. 1857, October 14.—N° 2625.

SWINBURN, JOHN FIELD.—"Improvements in fire-arms." —A communication. Locks.

"The arm of the tumbler and the swivel are so constructed and "arranged on the lock that the three points, consisting of the "centre or pivot of the tumbler, the connecting pin of the

" tumbler and swivel, and that of the latter with the end of the " mainspring, shall be equidistant." A line passing through the centre of the tumbler arm will form an angle of about 25°, with a horizontal line through the centre of the tumbler when the lock is at rest. The stud of the mainspring is placed upon the extreme end of the turn, or upon the long or swivel side of the same.

[Printed, 7*d.*]

A.D. 1857, October 14.—N° 2630.

RESTELL, THOMAS.—" Improvements in breech-loading fire- " arms, in projectiles, and in cartridges for breech-loading arms."

The Specification and drawings, which should be referred to, describe a fire-arm in which the barrel is screwed into a breech-piece. A sliding bolt or plug works in the breech-piece, and is actuated by a lever. The plug has a steel face and a soft metal washer fixed at its front end. Other details are described.

Projectiles are made by casting lead or other soft metal round a hard metal core, made "like an ordinary screw or like a shaft."

Cartridges are formed in two or more parts, which are held together by the paper case, and are flexible.

[Printed, 1*s.* 5*d.*]

A.D. 1857, October 15.—N° 2636.

REEVES, CHARLES.—" An improvement or improvements in " the manufacture of swords, matchets, and knives."

The tangs of sword blades are made to diminish in thickness or taper by rolling them through grooved rollers made as described.

[Printed, 6*d.*]

A.D. 1857, October 17.—N° 2657.

BENTLEY, JOSEPH.—" Improvements in fire-arms." Locks. Revolvers.

The Specification and drawings describe improvements in locks constructed so that the hammer can be raised to half-cock, and discharged by drawing the trigger, or the lock may be cocked by hand.

Improvements on lever ramrods are described. The Specification of prior Letters Patent of December 4, 1852, (see ante, p. 132,) is referred to.

[Printed, 10*d.*]

A.D. 1857, October 22.—N° 2690.

REEVES, Charles.—"Revolving fire-arms. Locks."

The Specification and drawings describe double-actioned locks which may be cocked either by thumb or trigger.

[Printed, 7*d.*]

A.D. 1857, October 28.—N° 2740.

CHILD, John, and CHILD, Joseph.—"A double-barrelled " gun with an elevated rifled tubular rib."

An additional barrel or tubular rib is used for uniting two barrels instead of the ordinary top rib, or two hollow ribs may be used.

The tubular rib may be rifled so as to carry a suitable bullet. A striker is connected to the nose of either of the cocks.

[Printed, 6*d.*]

A.D. 1857, November 7.—N° 2824.

ADAMS, John.—" Improvements in revolver fire-arms." Locks. Ramrods.

A sliding bolt is interposed between the hammer and the cap on the nipple. The bolt slides through a hole in the frame of the fire-arm, and is enlarged at its end so as to deflect the products of the explosion of its cap, and prevent them from passing back through the hole.

Improvements in double-actioned locks and in lever ramrods, and in the mode of attaching the fixed barrel of a rotating arm to the frame or body of the piece, and a locking safety bolt, are described with the aid of drawings.

[Printed, 1*s.* 2*d.*]

A.D. 1857, November 17.—N° 2882.

BOUSFIELD, George Tomlinson.—" Improvements in fire- " arms, and in detonating compounds to be used therewith."—A communication.

Elongated priming, formed in strips or in pieces of a cylindrical or other shape, are used; they are made of a composition of detonating compound, as fulminate of mercury and collodion.

Suitable locks, with sliding and cutting-off apparatus, are described.

[Printed, 6*d.*]

A.D. 1857, November 17.—N° 2886.

RICHARDES, WILLIAM EARDLEY.—"An improved war "weapon." Sword and pistol.—(Provisional Protection only.)

It was proposed to attach a sword blade to a double-barrelled pistol in such a way that the stock of the pistol may serve for the hilt of the sword.

[Printed, 3*d.*]

A.D. 1857, November 26.—N° 2951.

FARROW, CHARLES.—"An improvement in fire-arms." Cartridge nipper.—(Provisional Protection only.)

It was proposed to attach to a fire-arm a nipper having a serrated edge connected with a lever and spring for tearing off the ends of cartridges.

[Printed, 3*d.*]

A.D. 1857, November 28.—N° 2964.

CHASSEPOT, ANTOINE ALPHOUSE.—"Improvements in breech-"loading fire-arms."

The Specification and drawings describe a fire-arm having a breech-piece which has a rotatory and a reciprocating motion. A plug with an india-rubber washer is used, and the breech-piece is fastened or locked when pushed home by suitable projections and traverse grooves.

[Printed, 7*d.*]

A.D. 1857, November 28.—N° 2966.

TINDALL, ROBERT.—"Improvements in harpoon guns and "ammunition."

Harpoon guns are described from which cylindro-conoidal shot or shell may be fixed. Suitable apparatus is used for connecting the harpoon projectiles with lines.

[Printed, 8*d.*]

A.D. 1857, December 1.—N° 2983.

SPRAY, FREDERIC GEORGE.—"Improvements in the manufac-"ture of gunpowder."—(Provisional Protection only.)

It is proposed to use steam pipes for boiling in vacuo and cleaning saltpetre when in a state of solution. Steam jets and pipes are used for moistening and drying gunpowder in different stages of its manufacture. For glazing gunpowder two barrels are used, which revolve concentrically while the powder is placed between them.

[Printed, 3*d.*]

A.D. 1857, December 8.—N° 3042.

WILLETT, Thomas William.—" Improvements in the manu-" facture of gunpowder, and in the machinery connected there-" with."

Incorporating mills are so constructed that the beds thereof rotate about a vertical axis, while the horizontal axes of the edge runners " have no other motion than in a vertical plane, whose " distance from the bed of the mill is regulated to a given dis-" tance, at the same time they may be raised entirely therefrom."

Press plates with raised surfaces or ribs are used for indenting the cakes, and facilitating their being broken up as required. A drum-shaped rotating vessel, heated by a steam jacket, is used for mixing the required ingredients, and copper or hard wooden balls are placed in the vessel.

Saltpetre in a state of solution is heated and mixed with charcoal in an open copper pan, and the sulphur is to be mixed with the compound when it is cooled down to about 60° F.

A granulating machine is described, in which the presscake is placed on a table having parallel metal ridges, and is pressed downwards by suitably arranged pressing plates or ridges.

[Printed, 7*d.*]

A.D. 1857, December 21.—N° 3135.

BROOMAN, Richard Archibald.—" Improvements in breech-" loading fire-arms."—A communication.—(Provisional Protection only.)

The Provisional Specification relates to a fire-arm having a moveable sliding breech-piece, which is connected with suitable lever apparatus, so that the breech-piece is moved by the pressure of the forefinger upon a hook attached to the stock.

[Printed, 3*d.*]

A.D. 1857, December 24.—N° 3156.

REEVES, CHARLES.—" Improvements in repeating or revolving " fire-arms."

The Specification and drawings, which should be referred to, describe a revolving fire-arm which may be either cocked by hand or by pressing the trigger. The cock is held by one end of a bell-crank lever, and the trigger acting on the other end liberates it.

A jointed lever loading rod is used.

The axis of the revolving chamber is fixed " by means of a " spring catch fastening placed underneath the fore part of the " fire-arm."

[Printed, 9*d.*]

1858.

A.D. 1858, January 19.—N° 89.

WELLS, BENJAMIN BLAKE.—" Improvements in ordnance."

Pieces of ordnance are formed in segments, divided longitudinally, and hooped together by screwed hoops.

The segments have flanges or are tongued and grooved. The muzzle and breech are screwed on. The segments may be unscrewed from the breech, and, a suitable muzzle being screwed in the latter, it is made to serve as a mortar. The piece is rifled by means of rounded projections, ridges formed on the inside of each segment. The ridges may be made separately, and be fixed in their places by being inserted in grooves, or otherwise.

[Printed, 10*d.*]

A.D. 1858, January 26.—N° 138.

STRACY, SIR HENRY.—" An improved cartridge."

A paper tube is made of the length intended for the cartridge. One end is closed over an ordinary gun wad, and its edges gummed. The shot are then poured in, then another wad is inserted, then the powder, then a third wad, to the under side of which a piece of tape is attached. The edges of the paper tube are gummed over the third wad, and the tape protrudes from underneath it. To load, the third wad is torn out by means of the tape, and the charge is then inserted in the barrel in the usual way.

[Printed, 5*d.*]

ADDENDUM.

A.D. 1849, November 24.—N° 12,861.

COWPER, Charles (*a communication from Messrs. Petin, Gaudet, and Co.*)—" Improvements in piling, fagotting, and forg-" ing iron for plates, bars, shafts, axles, tyres, cannon, anchors, " and other similar purposes."

This invention relates partly to the manufacture of wrought-iron cannons, mortars, and other ordnance. The piles or faggots from which the cannons are to be forged are composed of bars of a trapezoidal or wedge-shaped section, placed with their inclined faces in contact, so as to form a series of oblique joints; the object being to insure perfect welding, and prevent that tendency to separate under the blows of the hammer which is urged as an objection to the perpendicular joints produced when bars of a rectangular section are used.

Instead of employing bars with plane sides, the piles or faggots may be formed by surrounding a cylindrical bar of iron with bars of a peculiar curvilinear section, whereby all the joints will be curved; or these bars may be made with two of their sides straight, but so that the joints will be in straight lines which do not radiate from the centre. The pile or faggot is brought to a welding heat and hammered between hollow dies or swages which form the faces of the hammer and anvil.

A further improvement consists " in surrounding a central mass " or faggot with bars of a trapezoidal section, laid round it in the " form of a helix or screw, and again surrounding this first " layer with several others, applied by mechanical means, and in " then submitting the new faggot, thus obtained, to the action of " the hammer between swages or dies of the proper form and " dimensions."

A peculiar method of welding the trunnions to wrought-iron cannons and other ordnance also forms part of this invention.

[Printed, 1*s.* 2*d.* See Mechanics' Magazine, vol. 52, p. 437; and Patent Journal, vol. 9, p. 106.]

APPENDIX.

CHRONOLOGICAL LIST OF WORKS ON FIRE-ARMS, AMMUNITION, AND GUNNERY.

A.D.

1489. The Fayt of Armes and of Chevalrye, translated out of the French by William Caxton. A compilation from Vegetius and others.
1527. Albert Durer. Unterricht von Befestigung der Stätte Schlosse und Flecken. Nuremberg.
1530. Preussens (Germ.) Rank and Designation of all Troops, Species, Name, and Number of all Arms contained in an Arsenal, of every Weight, Calibre, &c.
1537. Tartaglia. Nova Scientia. Venetia.
1540. Biringuccio. De la Pirotechnia. Venetia.
1546. Tartaglia. Quesiti ed Inventioni Diversi. Venetia.
1553. Agrippa. Trattato de Scientia d'Arme. Roma.
1554. Zauchi. On Fortifying Cities.
1556. Bereil or Beroil de la Foille. La Manière de Fortifier Villes, Chasteaux, etc.
1557. Frousberg. On Arms and Fire-works.
1561. Scmidlap. Fire-works. Nuremberg.
1564. Giacomo Cataneo. Fortification, &c.
1567. Mora. On Batteries, &c. Venice.
1568. Ferretti. Osservanza Militare. Venetia.
1571. Cataneo. Dell Arte Militare. Brescia. See work on Bombadier. 1582.
1572. Vegetius de Re Militari. Translated by J. Sadler. London.
1572. Biringuccio. Translated by J. Vincent. La Pyrotechnie. Paris.
1572. Hero. De Machinis Bellicis Venetiis.
1573. Machiaval. Arte of Warre. Set forth in English by Peter Whitehorne. London. There are editions of 1560 and 1588.
1576. The Forrest. Printed by John Day.
1578. Of the Knowledge and Conduct of Warres.
1578. Bourne. Art of Shooting great Ordnance. Reprinted, 1643.

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1578. Manus. Artillery, &c. Dantzig.

1579. A. de Pasino Ferrarois. Discours sur plusieur Poincts de l'Architecture de Guerre.

1579. Leonard and Thos. Digges. Stratioticos, including a Treatise of Pyrotechnie and Great Artillerie. See 1590.

1581. Thos. Styward. Pathwaie to Martial Discipline. In two Books.

1582. Rocca. Discorsi de Guerra. Venetia.

1584. Gabriel Busca. Instruzzione de' Bombadieri. Carmagnola.

1586. Luigi Collado Hispano. Practica Manuale di Artiglieria. Venetia.

1587. Rich. Pathway to Military Practise. London.

1588. Tartaglia. Three Books of Colloquies concerning the Arte of Shooting. Translated by Cyprian Lucar, with the Lucar Appendix, shewing the Properties, Office, and Duties of a Gunner, &c.

1588. Whitehorne. Certaine Waies for the ordering of Soldiers in Battleray, &c. London.

1588. Cataneo. Briefe Tables for the Forming of a Just Battaile. London.

1588. Ramelli. On Ingenious Machines.

1590. Barrett. Theorike and Practike of Modern Warres.

1590. Digges. Arte of Great Artillery.

1590. Smythe. Discourses concerning the Forms and Effects of divers Sorts of Weapons, and of the great Sufficiencie and Excellencie of Archers. London.

1591. Brechtel. Artillery and Fire-works.

1592. Collado. Artillery. Milan.

1593. Sutcliffe. The Practice, Proceedings, and Laws of Armes.

1598. Boilot. Modelles, &c., Instruments de Guerre. Chaumont.

1598. Rojas. Fortificacion. Madrid.

1599. Blondel. Fortification.

1599. Gallé. Table de la Portee des Canons.

1600. Smith's Art of Gunnery. See 1643.

1602. Perret. Fortification et Artifices.

1603. Clavius. Artifices and Machines.

1603. Jacobi. Art of manufacturing Arms.

1605. Gentilini. Artilleria. Venetia.

1605–8. David Rivault. Les Elémens de l'Artillery. Paris.

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1608. The Exercise of Arms for Baliures, Musketts, and Pikes. From the Dutch of J. de Gheyn.
1610. Ezanville. Invention Nouvelle des Eperviers et Globe de Guerre.
1610. Avalourt. The Arsenal and Magazine. 1610–23.
1611. Lechuga. Artillery.
1614. Ufano, D. On the Use of Artillery. Frankfort. Translated by J. T. de Bry.
1618. Roger Bacon. De Secretis Operibus, etc. See Edition Oxford, 1845.
1618. Buhlen. Book of Artillery, Modes of Casting, Proving, &c.
1619. Kobel. Mil. Fire-works.
1620. Hanzelet. Machines Militaires.
1620. Langrois. Artifices de Feu.
1620. Thibourel. Military Engines.
1620. Besolders. Mortars.
1621. Sardi. Artigliera.
1622. Markham. Episles on Warre. London.
1624. Schwachius. Artillery.
1626. Cooke. The Character of Warre, or the Image of Martial Discipline. London.
1628. Norton. The Gunner, shewing the whole Practice of Artillery. London.
1628. Cooke. The Prospective Glasse of Warre.
1629. Malte. Artillery Fire-works.
1631. Sciaban.
1633. Barolois. Ars Muniendi.
1634. Gerard Barry. A Discourse of Military Discipline. Bruxelles.
1635. Babington. Pyrotechnia, or a Discourse of Artificial Fire-works. London.
16—. Mainwayring. Seaman's Dictionary.
1639. Du Praissac. The Art of Warre. Translated by Jno. Cruso. Cambridge.
1639. Ward. Animadversions of Warre, &c. London.
1639. John Roberts. The Compleat Canonier, or the Gunner's Guide. Edititions 1686 and 1762.
1640. Zonta. Artillery. Venetia.
1640. Luteanus or Puteanus. On a New Invention for Bombs.
1640. Denison. Philosophical Pyrotechny. Latin.

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1641. Collado. On the Invention of Gunpowder. Spanish.
1641. Gentiliani. Artillery.
1641. Hexham. Military Art, Ordnance, &c. London.
1642. Memno. Artilleria. Spanish.
1642. Hazzairo de la Isla. Artillery.
1642. Tirgino. Artillery. Spanish.
1643. Norton. The Gunner's Dialogue and Art of Great Artillery pp. 94.
1643. Bourne. Art of Shooting Great Ordnance. Rep.
1643. Smith. Art of Gunnery, with certain additions thereto, pp. 120.
1643. Cordo. Artillery. Spanish.
1643. Furtenhack. New Mode of Making Arms.
1644. Mersenna. Balistique et Theorie des Armes.
1644. Torricelli. De Motu Graviorum et Naturaliter Projectorum. Florence.
1645. Pagan. Fortification.
1645. Goldman. New Fortification.
1646. Malthus. Pratique de la Guerre Artillerie.
1646. Eldred. The Gunner's Glasse. London.
1647. Nat. Naye. The Art of Gunnery. Also 1664 and 1670.
1647. The True Way to make all Sorts of Gunpowder and Matches. Anon.
1650. Siemienowicz. Casr. Ars Magna Artilleriae. Amsterdam. English translation.
1650. Lieut.-Colonel Elton's Complete Body of the Art Military, with the Practical Parts of the Art of Gunnery. Also 1668.
1656. Schreiber. Fire-works, Artillery.
1657. Sylvius. Fire-works.
1660. Fortius. The Perfect Gunner.
1661. Barriffe. Military Discipline, or the Young Artilleryman. London.
1663. Worcester, Marquis of. Century of Inventions. See later editions. Partington. 1825.
1664. Nye's Artillery.
1665. Philosophical Transactions. London.
1667. Ruse. The Strengthening of Strongholds. Translated from the Dutch by His Majesty's command. London.
1668. Joinville. Histoire du Roy St. Loys.
1669. Cvehorn. Artillerie et Arsenaux.

A.D.

1669. Kostner. Elements of Artillery.

1670. W. Clarke. Natural History of Nitre. London.

1670. Nye. Art of Gunnery. London.

1671. Gamboa. Artillery, Metallurgy. Spanish.

1671. Cranach. Military Inventions.

1672. Tacquet. Military Architecture. Translated from the Latin by J. Lacy. London.

1672. The Complete Gunner. London.

1674. Anderson, R. Genuine Use and Effects of the Gunne. London.

1675. Gaya. Treatise on Arms, Warlike Machines.

1677. Orrery, Earl of. A Treatise of the Art of War.

1678. Gaya. The Art of War and the Way it is at present practiced in France. London.

1681. Northon's Practice of Artillery.

1683. Blondel. Art de jetter les Bombes. Paris.

1683. Moore. Treatise on Artillery.

1683. Moretti, General. Treatise of Artillery. Translated, with some Notes thereon, and some Additions for Sea Gunners, by Sir Jonas Moore; together with an Appendix of Artificial Fireworks, by Sir Abraham Dager. London.

1684. Mallet. On Artillery. Paris.

1684. Halley. On the Effect of Gravity in Gunnery. Phil. Transac., 1684–1686.

1685. Buchner. Theory and Practice of Artillery.

1685. Catherinot. Artillery.

1685. Euguenius. Armourers' Manual.

1686. Hawksbee on Gunpowder.

1687. Newton. Principia. Lib. II. Projectiles.

1688. Wickrath. Collections of Artillery.

1688. Sardi. On Offensive Arms and Ancient Machines.

1689. Binning translated.

1690. Anderson, R. To Hit a Mark. London.

1690. The Perfection of Military Discipline, with the Art of Gunnery. London.

1690. Anderson, R. Proposals for the Improvement of Great Artillery.

1690. Gauthier. Artillery, Ranges, Construction, &c.

1690-95. Denis Papin. Account of his Machines and Guns in the Acta Eruditorum. Leipsic.

A.D.

1690. Anderson, R. On the Nature and Use of Rockets.

1693. Endel. The Armourers' Manual.

1695. Morasca. On the Dimensions of Artillery.

1697. Suriney de St. Rémy. Mémoires de l'Artillery. Paris.

1703. Sir Jonas Moore. Modern Fortification. London.

1705. Savery. The New Method of Fortification by Coehorn. Translated from the Dutch. London.

1707. Barker. The Treasury of Fortification. London.

1723. St. Rémy on Artillery. Paris.

1729. G. Shelvocke. The Great Art of Artillery. Translated from the French of Casimir Siemienowicz. London.

1731. J. Gray, F.R.S. A Treatise of Gunnery. London.

1731. Puységur. Art de la Guerre, par Principes et par Règles.

1731. Dutens. Origine des Descouvertes attribuées aux Modernes.

1733. Wm. Sterrat. The Doctrine of Projectiles demonstrated and applied to all the most useful Problems in Practical Gunnery. Dublin.

1736. Daniel Speckle. On Fortification. Leipsic.

1742. Benjamin Robins. New Principles of Gunnery. 2nd edit. 1761. London.

1743. Wm. Macbean. The Constitution of Gunnery, by way of Question and Answer.

1744. Lens. The Grenadiers' Exercise of the Grenado in H.M.'s 1st Regiment of Foot Guards.

1746. Anon. A Treatise of Artillery. Translated from the French of Le Blond. London.

1748. Anon. The New Method of Fortification of M. de Vauban, with a Treatise of Military Orders and of Gunnery.

1748. Dinsdale. Art of Fortification delineated. From the French of Buchotte. London.

1748. T. Simpson. Motion of Projectiles near the Earth's Surface considered, independent of the Properties of the Conic Sections. See Phil. Trans.

1752. Belidor. Edited by Manningham. Gunpowder and Mines. London. See ed. 1756.

1756. Molyneux. The Target; or a Treatise upon a Branch of the Art Military. London.

1756. Fr. Holliday. An Easy Introduction to Practical Gunnery; or the Art of Engineering.

1757. J. Muller. A Treatise of Artillery for the Use of the Royal Military Academy, Woolwich. Also 1780.

A.D.

1759. Anon. The Military Engineer. From the French of Le Blond. London.

1760. Count D'Arcy. An Essay on Artillery.

1763. Robson. The British Mars, containing several Schemes and Inventions to be practised by Land or Sea against an Enemy. London.

1764. Le Blond. Treatise of Artillery, translated. London.

1765. Lieut. Jones, R.A. A New Treatise on Artificial Fireworks. London.

1766. Lieut. E. Williams, R.A. The Theory and Practice of Gunnery, with Remarks on Belidor. London.

1767. Regulations to be observed by the Battalion Guns at a Review before His Majesty.

1767. J. Muller. Supplement to the Treatise of Artillery. London.

1772. Ardesoif. An Introduction to Marine Artillery and Gunnery. Gosport.

1776. Dr. Lind. Description of Rifled Ordance. Edinburgh.

1776. J. Glennie, M.A. History of Gunnery. Edinburgh.

1777. Hugh Brown. The True Principles of Gunnery, with translations of Euler's Observations on B. Robins.

1778. Leo the Philosopher. Institutions Militaires. Translated by M. Manzeroy. Written in the 9th century.

1778. Pringle. A Discourse on the Theory of Gunnery, delivered before the Royal Society. London.

1778. Hutton. On the Force of Fired Gunpowder, and the Initial Velocity of Cannon Balls, determined by Experiment. London.

1779. Burrow. An Essay on the Theory of Gunnery or the Doctrine of Projectiles in a non-resisting Medium. London.

1782. Clark, John. Essay on Naval Tactics.

1786. Hutton. New Experiments in Artillery, 1783—1786. *Vide* Hutton's Mathematical Tracts, No. 9.

1788. Captain H. T. Thompson, R.A. Translation of D'Antoni on Gunpowder and Fire-arms, and on the Service of Artillery in time of War. London. Id.

1789. Memoirs of the Royal Regiment of Artillery, commencing 1743. MSS. Woolwich.

1791. Anonymous. Essay on Shooting. London.

A.D.

1795. Bolton. Remarks on the present Defective State of Firearms. London.

1796. Dutens. Origine des Découvertes attribuées aux Modernes.

1798. Staunton. Embassy to China. London.

1800. Scheel. A Treatise on Artillery. Philadelphia.

1801. Grose. Military Antiquities. History of the English Army.

1802. Count Rumford (B. Thompson). Experiments to determine the Velocity of Projectiles and the Force of Gunpowder, &c. London.

1804. Marcus Græcus or Gracchus. Liber Ignium ad comburendos Hostes. Three Sheets. 4to. Paris.

1805. Robins, B. New Principles of Gunnery. First printed in 1742. London.

1806. Froissart. Chronicles. Translated by Johnes.

1809. Toussard. Elements of Artillery. Philadelphia.

1811. Jomini. Histoire et Militaire des Campagnes de la Révolution. Paris.

1812. Scloppetaria, Captain Beaufoy. On Rifles. London.

1812. Hutton, C. Tracts on Gunnery, &c. London.

1816. Morla. Tratado de Artilleria. Segovia.

1818. Remarks on Artillery, &c. Printed for Rowland Hunter. London.

1827. Miller. On Percussion Shells. London.

1828. Michaud. Histoire des Croisades. Paris.

1828. Bentham, Sir S. Naval Essays. London.

1829. Douglas, Sir Howard. Naval Gunnery. London. See later Editions.

1832. Braddock, J. Memoir on Gunpowder.

1835. Baker, Ezekiel. Remarks on Rifle Guns. London.

1839. Anderson. Instruction for Field Artillery. Translated from the French. Philadelphia.

1841. Greener. Science of Gunnery. London.

1841. Wilkinson. Engines of War. London.

1844. Joinville, Prince de. Naval Strength of France compared with that of England. Translated by W. Peake. London.

1845. Reinaud et Favé. Du Feu Grégois et des Origines de la Poudre. Paris.

1845. Favé, Capitaine. Histoire et Tactique des Trois Armes. Paris.

1845. Meyer. Histoire de la Technologie des Armes à Feu.

A.D.
1845. Figuier, Louis. Exposition et Histoire des Principales Découvertes Scientifiques Modernes.
1845. Ward, J. H. Ordnance and Gunner. Philadelphia. See later editions.
1845. Mordecai. Experiments on Gunpowder. Washington.
1847. Aide-memoire to the Military Sciences. Weale. London.
1848. Chapman. On the American Rifle. New York.
1848. Mordecai. Experiments on Gunpowder. Washington.
1848. Mordecai. Artillery of the United States. Washington.
1849. Kingsbury. Artillery and Infantry. New York.
1851. Favé. Louis Napoléon. Nouveau Système d'Artillerie.
1852. Scoffern. Projectiles and Weapons of War. See also later edition, 1857.
1852. Chesney, Col. Past and Present State of Fire-arms. London.
1853. Dahlgren. Locks and Primers (Naval). Philadelphia.
1854. Jervis, J. W., Capt. The Rifle Musket. London.
1854. Jomini. Summary of the Art of War. Translated by Winship. New York.
1855. Blakely, T. A. Science of Gunnery. See ed. 1858. London.
1855. Boxer. Treatise on Artillery. London.
1856. Napoléon III. Du Passé et de l'Avenir d'Artillerie. The Preface dated, Fortress of Ham, May 24, 1846.
1856. Wade, Major. Reports on Experiments on Metals for Cannon. Philadelphia.

This list is compiled principally from one published in the minutes of proceedings of the Royal Artillery Institution, Woolwich. It does not claim to be a complete one, nor has it been thought necessary to carry it down to the latest date, and insert all the recent publications. Those of value are well known, and a mere catalogue of their names would not render any material assistance, while this list, already large, would be unnecessarily prolonged.

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